DOI 10.1007/978-3-658-04091-8

ZfB-SPECIAL ISSUE 4/2013

ZfB
ZEITSCHRIFT FÜR
BETRIEBSWIRTSCHAFT

Innovativeness in family firms: drivers of innovation and their mediating role

Arthur Posch · Armin Wiedenegger

Abstract: Extant literature on the effects of family involvement on innovativeness has so far produced controversial results. While some papers argue that family firms are less innovative than non-family firms, other studies make a case for the exact opposite. So far most studies have tackled this question by taking a particularistic perspective. In this paper, however, we employ a broader approach and consider multiple drivers of innovation as a starting point. Drawing on the idiosyncrasies of family firms, we then predict a difference between family firms and non-family firms with regard to innovation drivers. Our second hypothesis proposes that the effect of family involvement on a firm's innovativeness is mediated by several drivers of innovation. We test our hypotheses using a data set of 184 Austrian companies. Our results indicate significant differences between family firms and non-family firms for six drivers of innovation. Moreover, our findings suggest that there is a multitude of factors that serve as mediators of the relationship between family involvement and innovativeness.

Keywords: Family firms · Innovativeness · Drivers of Innovation · Mediation Effect · Propensity Score Matching

JEL Classification: G32 · M19 · O31

Dr. A. Posch (✉)
Institut für Unternehmensführung, Wirtschaftsuniversität Wien
Welthandelsplatz 1, Gebäude D2, 1020 Wien
e-mail: arthur.posch@wu.ac.at

Dr. A. Wiedenegger
Institut für Unternehmensführung, Wirtschaftsuniversität Wien
Welthandelsplatz 1, Gebäude D2, 1020 Wien
e-mail: armin.wiedenegger@wu.ac.at

P. Moog, P. Witt (Hrsg.), *Mittelständische Unternehmen*,
DOI 10.1007/978-3-658-04092-5_5, © Springer Fachmedien Wiesbaden 2014

1 Introduction

In view of increasing changes in the environment, innovativeness[1] has become a critical and one of the few sustainable sources of competitive advantage (Crossan and Apaydin 2010; Dess and Picken 2000). Furthermore, scholars have highlighted the vital importance of innovation[1] as a driver of performance (Mone et al. 1998). Companies constantly need to rethink their ways of doing business due to globalization, advances in communication and technology, newly emerging markets as well as quickly changing customer demands (Hall et al. 2001). Therefore, every company is constantly threatened with obsolescence and decline (Litz and Kleysen 2001). Some authors even argue that innovativeness constitutes the key competitive ability to succeed in the 21st century (Tushman and O'Reilly 1997; Kao 1997; Kanter 1997). Shane and Venkataraman (2000, p. 219) also underscore the practical importance of innovation by stating that without an understanding of entrepreneurship and innovation *"the understanding of the business landscape remains incomplete"*.

As a matter of fact family firms cannot insulate themselves from the importance of innovativeness (Hall et al. 2001). In a similar vein, researchers underline the importance of family firms investing in innovation in order to avoid decline and foster growth (Upton et al. 2001; Zahra et al. 2004; Eddleston et al. 2008). Although Damanpour (1991) emphasizes the importance in innovation research to distinguish organizations by type (e.g. distinction by industry, for-profit and not-for-profit organizations, etc.), Craig and Moores (2006) state that despite the universally agreed-upon importance of family firms as a distinct organizational type there is a lack of research on the linkages between family involvement and innovation. Echoing this sentiment, Kellermanns et al. (2012, p. 89) emphasize that the *"study of innovative behavior in family firms is essential since these firms are governed by a unique set of norms, cultures, and processes that are not found in nonfamily firms"*. A better understanding of how family involvement can support or inhibit a firm's capability to capitalize on its innovativeness is important due to the fact that innovation has the potential to create and sustain competitive advantage and to increase performance (Kellermanns et al. 2012; Hayton and Kelley 2006). Shedding more light on the issue of innovation in family firms is also highly relevant from an economic perspective since family firms form the backbone of most national economies (Chrisman et al. 2003).

De Massis et al. (2013) posit that research on innovation in family firms is still at a very early stage despite the fact that it has recently experienced increasing interest, with most studies comparing family and non-family firms. While some scholars argue that family firms are less innovative than non-family firms (e.g. Block 2009; Donckels and Fröhlich 1991; Hülsbeck et al. 2012; Short et al. 2009), other researchers make a case for the exact opposite (e.g. Craig and Moores 2006; Gomez-Mejia et al. 2007; Gudmundson et al. 2003; Zahra et al. 2004). Existing research thus shows two contradictory research streams with regard to innovation in the family business context.

Interestingly, most studies on innovation in the context of family business focus only on very few drivers of innovation (e.g. R&D, risk propensity, behavioral strategic controls, etc.) (Block 2012; Chen and Hsu 2009; Chin et al. 2009; Classen et al. 2012; Gudmundson et al. 2003; Hsu and Chang 2011; Munari et al. 2010). Extant research on innovation, however, posits that the phenomenon is influenced by a wide array of different

factors (Crossan and Apaydin 2010; Damanpour 1991). Moreover, existing innovation frameworks that predict the success in innovation development do not shed light on the question whether critical success factors differ between family and non-family firms (De Massis et al. 2013; Ernst 2002). Two recently published qualitative papers by De Massis et al. (2013) and Cassia et al. (2012) address this gap and take a broader approach by shedding some light on the "black box" of innovation in family firms. Both studies investigate the differences between family firms and non-family firms with regard to organizational solutions and managerial processes employed in the innovation process. Our study follows a similar approach and covers two research questions. The first question addresses the effect of family involvement on organizational drivers of innovation. Based on a comprehensive literature review we derive hypothesis 1, which predicts a difference between family firms and non-family firms with regard to the drivers of innovation.

De Massis et al. (2013) also arrive at the conclusion that extant research hardly touches upon the indirect effect of family involvement on the relationship between innovation activities and innovation outputs. Furthermore, the authors underline the relevance of studying antecedents of superior innovation capabilities in family firms as well as in comparison with non-family firms (De Massis et al. 2013). Our second research question draws on the suggestions made by De Massis et al. (2013) and investigates not only the direct effect of family involvement on innovativeness but also drivers of innovation that serve as mediators. We draw on prior papers in family-business research that argue that family involvement does not display a direct effect on performance but rather an indirect effect through resources, processes and capabilities that are themselves influenced by family involvement (Habbershon and Williams 1999; Miller and Le Breton-Miller 2006; Dyer 2006; Lichtenthaler and Muethel 2012). We thus shed some light on the question how idiosyncrasies of family firms lead to advantages in the management and organization of innovation (De Massis et al. 2013). From a theoretical point of view, we thus contribute to the literature by using existing performance-frameworks for family businesses that are inspired by the resource-based view of the firm and translate them for the innovation context.

Our results support hypothesis 1 and indicate that family firms differ from non-family firms significantly with regard to the drivers of innovation. Family firms display significantly higher technical knowledge resources, slack, organizational learning, flexibility, long-term orientation and external communication. Furthermore, we show through the empirical testing of hypothesis 2 that the influence of family involvement on innovativeness is created by its effect on these drivers of innovation.

This study contributes to existing research in the following ways. First of all, we empirically investigate how family involvement influences drivers of innovation and thus provide a quantitative extension of the papers by De Massis et al. (2013) and Cassia et al. (2012). Secondly, we make use of a relatively new technique in the field of family-business research (propensity score matching, PSM) and thus comply with previous claims for truly isolating "the family effect" (Dyer 2006; Westhead and Cowling 1998). In doing so, we apply the same logic as proposed by previous papers (Dyer 2006; Miller and Le Breton-Miller 2006) and find empirical evidence that family involvement displays an indirect effect on innovativeness through multiple drivers of innovation. Thirdly, the results of our study provide implications for future research on innovation in family firms. Studies that

only make use of single drivers of innovation to predict differences in the innovativeness of family and non-family firms therefore tend to yield only incomplete pictures since innovation is driven by a multitude of factors. Furthermore, studies that merely compare family firms and non-family firms in terms of innovativeness without taking into account drivers of innovation might be problematic since these studies implicitly assume a direct effect of the family variable which according to our results is at best weak.

Fourthly, since our study covers both the family effect and innovativeness, we conform to previous calls for research that considers both the family and the firm (Aldrich and Cliff 2003; Heck 2004; Kellermanns et al. 2012)

Our results have also practical implications. Based on extant literature and on our data we identify six drivers that affect innovation positively. As a matter of fact, our study is therefore also of interest for managers since it names factors that drive the success of innovation (Cooper and Kleinschmidt 1987). Furthermore, our research also highlights the fact that what is beneficial for non-family firms need not necessarily be beneficial for family firms. In this sense the results of this paper provide clear evidence that the "blind" use of innovation concepts developed for non-family firms might not prove successful in the family-business context (De Massis et al. 2013). Contrarily, our results indicate that there might be some lessons for non-family firms to be learned from family firms with regard to the drivers of innovation. In this sense, our results confirm the work of Gudmundson et al. (2003).

The remainder of this paper is structured as follows. The next section contains a brief review of the literature on family firms and innovativeness. Section 3 develops the hypotheses that guide the empirical work. Section 4 describes the research design. Section 5 deals with data analysis and subsequently the findings and section 6 provides a summary and a conclusion.

2 Literature Review

2.1 Idiosyncrasies of family firms

Existing research on family business is characterized by the fact that there is still no universally agreed upon definition of what constitutes a family business. Astrachan et al. (2002) for instance note that there is still no widely accepted definition of a family business. Furthermore, based on a review of definitions employed in previous studies, they conclude that up to now there has been no clear demarcation between family and non-family firms.

However, there is widespread acceptance that most definitions seem to depict the crucial role of the family with regard to determining the vision and control mechanisms employed in a firm (Sharma 2004). Following this argument, this paper shares the view prevailing in literature that among the multitude of conditions suggested for identifying what defines family firms and what sets them apart, the conditions dominant family ownership and significant involvement of family members in the management of the firm are most important (e.g. Chua et al. 1999; Daily and Dollinger 1992; Kotey 2005). In this paper we thus use a very narrow definition of family firms. Similar to Naldi et al. (2007),

we use three classification criteria: family ownership, family representation on the top management team and self-perception as family firm. Family ownership has to exceed 50% of ordinary voting shares and family leadership has to be present in the sense that the family is represented on the top management team. Moreover, we checked whether the firm perceives itself as a family firm.[2] The reason for employing this narrow definition is that existing research shows that the idiosyncrasies of family involvement appear when the firm is not only owned by the family but when in addition to family ownership family members are also part of the top management team (Chua et al. 1999; Daily and Dollinger 1992; Kotey 2005; Minichilli et al. 2010; Posch and Speckbacher 2012; Speckbacher and Wentges 2012; Tagiuri and Davis 1996). In the further course of this paper the terms family involvement, family variable, and family firm have identical meanings.

There is widespread consensus among family-business researchers that this type of organization is different from its peers due to the fact that family firms are characterized by an intertwined nature of family and business systems (Gomez-Mejia et al. 2011). Based on the overlap of ownership, family and management spheres some scholars argue that the family business is one of the most complex forms of business (Neubauer and Lank 1998; Craig and Moores 2006).

In the context of innovation studies, several typical features of family firms have been used to make a prediction about their innovativeness compared to non-family firms. Drawing on the intertwined nature of family business, Kellermanns et al. (2012) point out that a family firm's decision to engage in innovative behavior can be rather sophisticated since trade-offs between economic and family goals have to be made (Astrachan and Jaskiewicz 2008). Furthermore, extant literature brings forward arguments for both a positive and a negative effect of family involvement on innovativeness (Kellermanns et al. 2012).

Drawing on agency theory, several scholars point out that family owners are less diversified than other investors and thus more risk-averse (Hülsbeck et al. 2012; Naldi et al. 2007; Zahra 2005). There are three arguments that lend credibility to this proposition (Naldi et al. 2007; Carney 2005; Schulze et al. 2003). All three arguments can be interpreted as a consequence of the overlap of family and management spheres. First of all, due to the fact that the management of family firms tends to have most of its wealth tied up in the firm it is more conservative with regard to risk-bearing (Gedajlovic et al. 2004). Secondly, family managers engage in risk-taking activities with the awareness that family wealth and thus the welfare of future family generations is put at risk (James 1999; Schulze et al. 2002; Naldi et al. 2007). Thirdly, family firms are argued to be more risk-averse due to the fact that the family name and the family reputation might be damaged (Bartholomeusz and Tanewski 2006; Naldi et al. 2007). This risk aversion of family firms is consistent with the fact that they are often characterized as conservative (Aronoff and Ward 1995; Kets de Vries 1993; Sharma et al. 1997; Naldi et al. 2007), status-quo-oriented and inwardly directed (Hall et al. 2001) as well as reluctant to change (Beckhard and Dyer 1983; Vago 2004). Since innovation activities are by their very definition risky and since family firms are assumed to be more risk-averse than non-family firms, scholars argue that the former are less innovative than the latter (Hülsbeck et al. 2012; Short et al. 2009; Gudmundson et al. 2003).

Morck et al. (2000) investigate differences in the innovativeness between Canadian family and non-family firms and find empirical evidence that family firms are less inno-

vative than non-family firms. In a similar vein, Hülsbeck et al. (2012) and Block (2009) provide empirical findings that show a significant negative effect of family involvement in the management board on innovativeness.

On the other hand, extant literature also describes idiosyncrasies of family firms that hint at a positive effect of family involvement on innovativeness (Naldi et al. 2007; Carney 2005; Gomez-Mejia et al. 2011). Family firms for instance show a tendency to pursue a given strategy for a longer period of time (Ensely 2006). This long-term orientation is also reflected in the fact that family firms tend to take a long-term perspective when deciding about strategic investments (Le Breton-Miller & Miller 2006). This orientation of family firms is also described as patient capital, which prefers long-term gains over short-term results (Arregle et al. 2007; Harris et al. 1994). Moreover, family firms are usually characterized by less use of formal control systems (Daily and Dollinger 1992), faster, as well as more intuitive and more flexible decision-making (Gomez-Mejia et al. 2011; Kets de Vries 1993), and face less pressure from capital markets (Carney 2005). According to Short et al. (2009, p. 14), family firms might thus *"have the decision-making capabilities (e.g. speed), power, and flexibility to pursue innovative opportunities"* (Miller and Le Breton-Miller 2005). In this sense family involvement might even serve as an important catalyst for entrepreneurship and innovation (Aldrich and Cliff 2003; Rogoff and Heck 2003). This argumentation is in line with a more recent and complex view of family firms and their propensity toward innovation which is based on unique family-based characteristics (Kellermanns et al. 2012; Gomez-Mejia et al. 2007; Naldi et al. 2007).

There is also empirical evidence that supports the proposition that family involvement has a positive effect on innovativeness. Gudmundson et al. (2003) for instance predict that family firms are significantly less innovative than their non-family peers. The results of their analysis, however, reveal the exact opposite showing that family firms are actually significantly more innovative. Zahra (2005) investigates the influence of family ownership and involvement on entrepreneurship and innovation. His results indicate that family firms with multiple family generations involved in the management of the firm tend to be more innovative than other firms (Zahra 2005).

The discussion above shows that there are contradictory argumentations and findings with regard to the effect of family involvement on innovativeness (Kellermanns et al. 2012). To the best of our knowledge, extant empirical research has either compared family and non-family firms with regard to innovativeness in an aggregated way, or it has mainly focused on very few drivers of innovativeness to make predictions about the relationship between family involvement and innovation activity (De Massis et al. 2013). The innovation literature, however, has come up with several frameworks of innovation drivers that provide a more holistic picture (e.g. Damanpour 1991; Crossan and Apaydin 2010). We therefore aim to contribute to the literature that investigates the effects of family involvement on innovation by taking a broader perspective. In this sense our paper can be seen as an attempt to respond to Craig and Moore's belief (2006, p. 8) that *"there is still limited research on how processes or adoption of innovation takes place, its importance, and what impact the family has on innovation […]".* Our paper can also be interpreted as a quantitative extension of the pieces by De Massis et al. (2013) and Cassia et al. (2012).

2.2 Organizational drivers of innovation

Research on innovation covers a very broad field (Damanpour 1991). It is thus hardly surprising that authors define the concept of innovation differently. Damanpour (1991, p. 556) for instance defines an innovation as *"a new product or service, a new production process technology, a new structure or administrative system, or a new plan or program pertaining to organizational members"*. Lumpkin and Dess (1996, p. 142) employ a less strict definition of innovativeness by describing it as *"a firm's tendency to engage in and support new ideas, novelty, experimentation, and creative processes that may result in new products, services, or technological processes"*.

A very broad definition can be found in Crossan and Apaydin (2010, p. 1155), who define innovation as *"production or adoption, assimilation, and exploitation of a value-added novelty in economic and social spheres; renewal and enlargement of products, services, and markets; development of new methods of production; and establishment of new management systems. It is both a process and an outcome."* In line with these definitions we argue that innovation covers both process and product innovation.

The importance of innovation is constantly increasing, which is evidenced by the fact that it is one of the few sustainable sources of competitive advantage (Dess and Picken 2000; Tushman and O'Reilly 1997). Furthermore, empirical evidence suggests that innovation positively affects performance (e.g. Calantone et al. 2002; Cooper 2000; Klomp and van Leeuwen 2001; Li and Calantone 1998).

Since innovation has the potential to create sustainable competitive advantage, many papers address the antecedents and drivers of innovation and how to manage them (e.g. Damanpour 1991; Koc and Ceylan 2007; Smith et al. 2008; Crossan and Apaydin 2010).

Based on a meta-analysis, Damanpour (1991) identifies the following 13 different organizational determinants of innovation and specifies the nature of the expected relationship with innovation (see table 1).

Similarly, Crossan and Apaydin (2010) propose a framework of innovation determinants that includes innovation leadership, managerial levers and business processes as levers and distinguishes between innovation as a process and as an outcome. Innovation leadership is rooted in upper echelon theory (Hambrick and Mason 1984) and describes the ability and motivation of the CEO and the top management team to innovate. Managerial levers are based on the resource-based view of the firm (Barney 1991) and include the following five categories: mission, goals, and strategy; structure and systems; resource allocation; organizational learning and knowledge management; and organizational culture (Crossan and Apaydin 2010). Business processes are theoretically rooted in process theory and cover the following sub-categories: initiation and decision-making; portfolio management; development and implementation; project management; and commercialization.

Koc (2007) posits that antecedents of innovation comprise company culture, learning organization, human resources, idea generation, knowledge management, technology focus, cross-functional integration and knowledge dissemination. Out of these eight factors he identifies idea generation, human resources and cross-functional integration as the most important determinants of innovation capacity in software companies (Koc 2007).

Table 1: Drivers of innovation as proposed by Damanpour (1991)

Driver of innovation	Relationship	Explanation
Specialization	positive	represents different specialties found in an organization
Functional differentiation	positive	extent to which an organization is divided into different units
Professionalism	positive	reflects professional knowledge of organizational members
Formalization	negative	emphasis on following rules and procedures in conducting organizational activities
Centralization	negative	extent to which decision autonomy is dispersed or centralized within an organization
Managerial attitude toward change	positive	extent to which managers or members appreciate change
Managerial tenure	positive	length of service managers have within an organization
Technical knowledge resources	positive	technical resources and technical potential of an organization
Administrative intensity	positive	indicator of administrative overhead
Slack resources	positive	resources an organization has beyond what it minimally requires to maintain operations
External communication	positive	organization's capability to be in contact with and scan its environment
Internal communication	positive	extent of communication among organizational units or groups
Vertical differentiation	negative	number of levels in the organizational hierarchy

Similarly, Smith et al. (2008) name technology, innovation process, corporate strategy, organizational structure, organizational culture, employees, resources, knowledge management and management style and leadership as factors that influence an organization's ability to manage innovation.

For the purpose of this study we use the innovation framework proposed by Damanpour (1991) as a starting point. As described above, Damnapour (1991) identified 13 drivers of innovation. Out of these 13 drivers we only leave out specialization, functional differentiation, administrative intensity and vertical differentiation, since these factors are not so much driven by family involvement but rather by organizational drivers, such as size and strategy, which we control for in our analysis. Furthermore, we have also made use of more recent frameworks (Crossan and Apaydin 2010; Smith et al. 2008) and scanned them for innovation drivers that might be influenced by the family variable. This process resulted in the inclusion of three additional factors that influence innovation: organizational culture, organizational learning and flexibility. Consequently, we arrived at the following 12 drivers of innovation which will be considered in more detail during the course of this paper: professionalism, formalization, centralization, managerial attitude toward change, technical knowledge resources, organizational culture, internal communication, slack, organizational learning, flexibility, long-term orientation and external com-

munication. Nevertheless, caution is warranted since extant research hints at the fact that innovation research is fragmented, often lacks theoretical foundation and has not been completely tested in all areas (Crossan and Apaydin 2010). Thus, innovation frameworks make problematic assumptions and tend to be partial (Hobday 2005). As a matter of fact, this limitation also applies to the drivers used in our model.

3 Hypotheses development

In a first step we conduct a literature review on the effect of family involvement on drivers of innovation. Drawing on these drivers of innovation and insights from family-business literature, we derive hypothesis 1, which predicts differences between family firms and non-family firms with regard to these innovation drivers.

Professionalism

Damanpour (1991) lists professionalism as one of the positive drivers of innovation. Professionalism reflects the education and training of employees. In terms of human resource management, several studies point out that family firms display a propensity to lag behind compared to non-family firms in terms of implementing human resource management practices and policies (Reid and Adams 2001; Kotey and Folker 2007; De Kok et al. 2006). The results are in line with the propositions proposed by Astrachan and Kolenko (1994). They underscore that family firms face greater difficulty implementing employee selection and compensation systems due to the volatility created by the overlap of family, business and ownership. With regard to employee selection, family firms are often claimed to favor family members, who are less qualified compared to external applicants, for positions within the firm. These staffing policies can ultimately result in inefficiencies (Dunn 1995). As another consequence of these policies, family businesses are also often claimed to have difficulty attracting highly qualified employees. Potential entrants are discouraged from signing with family firms as they see no potential for obtaining equity stakes, limited potential for professional development and a lack of professionalism (Covin 1994a, 1994b; Donnelley 1964; Horton 1986). Overall, Sirmon & Hitt (2003) reach the conclusion that family businesses often may face a lack of skilled employees. Moreover, Gomez-Mejia et al. (2011) state that family businesses are generally reluctant to professionalize the organization. Extant research thus assumes that family firms tend to display a lower level of professionalism compared to non-family firms.

Formalization

A driver that negatively affects innovation in Damanpour's framework (1991) is formalization. Formalization describes the *"importance of following rules and procedures in conducting organizational activities"* (Damanpour 1991, p. 589). According to Adams et al. (1996), family firms are less likely to have a written code of ethics. Instead they tend to rely more on role modeling to communicate behavioral norms to their employees. In a similar vein, Daily and Dollinger (1992) suggest that due to mitigated agency problems less formalized systems are likely to substitute for formal control systems in family-led firms. Reduced use of formal controls and coordination leads to an increased importance

of a firm's values as control mechanism (Zahra et al. 2004). Habbershon and Williams (1999) also point out that family firms usually prefer the use of implicit mechanisms rather than formalized procedures. This might also be due to the fact that family firms are usually subject to weaker external monitoring (Carney 2005). Previous research thus hints at the fact that family firms are characterized by less formalization compared to their non-family peers.

Centralization

According to Damanpour (1991), centralization refers to the extent to which decision authority is centralized within a firm. Furthermore, centralization has a negative effect on innovation. Research on family firms almost unanimously emphasizes that family firms rely less on delegation of authority, which results in management exerting a stronger influence on employee behavior (Dyer and Handler 1994; Daily and Dollinger 1992; Dyer 1986; Geeraerts 1984). Dyer (1986) underlines the fact that family firms are usually characterized by a "paternalistic" culture. This culture leads to hierarchical relationships and centralized authority. Furthermore, in a "paternalistic" culture family members make all significant decisions (Dyer, 1986). In a similar vein, Harris et al. (2004) describe family firms as placing a lot of emphasis on centralization and direct behavior guidelines. Echoing this viewpoint, Whisler (1988) states that decision-making in family firms is rather secretive and dominated by very few individuals that consider the involvement of non-family employees in this process as not necessary. Another reason for the prevalence of centralized structures is given by Daily & Dollinger (1992), who argue that, based on the fact that owner-managers are often invested to a high extent in their own firm, they have a desire to make decisions themselves and not to delegate decision authority. Moreover, the overlap of ownership and management in family firms *"gives the owner manager or family extremely high power within the organization, so that this agent operates under fewer internal and external constraints that limit managerial authority"* (De Massis et al. 2013, p. 23). Centralized decision-making is especially typical of first-generation family firms (Dyer 1988). However, evidence from prior research suggests that the decision-making style of subsequent-generation family firms becomes less centralized (Dyer 1988; Aronoff 1998). Therefore, it can be assumed that generational effects also impact the decision-making style of family firms.

Managerial attitude toward change

Managerial attitude toward change constitutes *"the extents to which managers or members of the dominant coalition are in favor of change"* (Damanpour 1991, p. 589). Family firms have been shown to display a tendency to dismiss change and to focus on keeping the status quo (Hall et al. 2001; Levinson 1987; Vago 2004). They are very often described as being introverted, focused on keeping old traditions and resistant to change (Kets de Vries 1993; Dyer 1994; Gersick et al. 1997). Hall et al. (2001) state that even though founders of family firms are entrepreneurs, their entrepreneurial abilities seem to disappear when the family is maturing. Succeeding generations of family managers then tend to run the business in line with old and established traditions and core values and are thus resistant to change (Hall et al. 2001). Family firms are therefore sometimes characterized as conservative and reluctant to induce change (Kellermanns et al. 2012). On the

other hand, however, scholars argue that compared to first-generation family firms later-generation family firms are more entrepreneurial and thus more open towards change since they have to be innovative in order to ensure to the survival of the firm (Kepner 1991; Salvato 2004; Kellermanns and Eddleston 2006; Kellermanns et al. 2008). Furthermore, Kellermanns et al. (2008) find empirical support that demonstrates that the number of generations involved in the family firm is positively associated with entrepreneurial behavior. Therefore, later-generation family firms might not differ from their non-family peers with regard to managerial attitude toward change.

Technical knowledge resources

Technical knowledge resources reflect an *"organization's technical resources and technical potential"* (Damanpour 1991, p. 589). Several authors have proposed that a lack of capital may cause family firms to face constraints with regard to other resources such as modern technology and skilled employees (Chandler 1990; Landes 1949; Mackie 2001; Miller et al. 2008). At the same time family firms are often said to become stagnant and focused on the status quo, refusing to invest in technological capabilities (Morris 1998). Conversely, some researchers argue that family firms possess specific traits (e.g. informal knowledge sharing, a strong sense of identity, smaller and more cohesive decision-making process) that might be beneficial for the development of technical knowledge resources (Zahra et al. 2007; De Massis et al. 2013). Overall, there is neither conclusive nor empirical evidence that family firms possess lower technical knowledge resources compared to non-family firms.

Organizational culture

Another factor that can influence innovation is organizational culture (Crossan and Apaydin 2010). Having a clear and shared vision among employees has a positive effect on innovation (Crossan and Apaydin 2010; Pinto and Prescott 1988). With regard to organizational culture extant literature describes family firms as having a special work-environment that is conducive to greater employee care and loyalty (Ward 1988; Vallejo 2008). Furthermore, Daily & Dollinger (1992) suggest that family firms show a tendency to use less formal control systems for guiding employee behavior and thus place more emphasis on informal elements such as organizational culture (Flamholtz et al. 1986). In a similar vein, Adams et al. (1996) state that family firms especially rely on role modeling to communicate behavioral norms to their employees. Similarly, Tagiuri & Davis (1996) also posit that family firms often possess the ability to generate a high degree of motivation and common perspective among their employees, which might be explained by the closer involvement of family members in the daily business (Goffee and Scase 1985; Huybrechts et al. 2011).

Internal communication

Internal communication is predicted to have a positive effect on innovation. Furthermore, it is defined as *"the extent of communication among organizational units or groups"* (Damanpour 1991, p. 590). Zahra et al. (2004) assume that family firms' culture is characterized by a stronger group orientation, which might result in a higher willingness of employees for cooperation and knowledge-sharing as their relations are more based on

trust. A specific understanding for each other, which is referred to by Tagiuri and Davis (1996) as family language, allows family firms to communicate more efficiently and to transfer information faster and with greater privacy. Moreover, the special family relations usually imply a high degree of motivation, loyalty and trust (Tagiuri and Davis, 1996). In a similar vein, agency theory posits that family involvement fosters communication and cooperation within the firm (Schulze et al. 2003). It is argued that the altruism prevalent in family firms increases communication and cooperation and thus reduces information asymmetries and increases the use of informal modes of control (Daily and Dollinger 1992; Schulze et al. 2003). These factors all indicate that family firms might have a competitive advantage in terms of internal communication compared to non-family firms.

Slack

Damanpour (1991, p. 589) defines slack as *"the resources an organization has beyond what it minimally requires to maintain operations"*. Furthermore, the availability of slack resources has a positive effect on innovation. Daily and Dollinger (1993) provide a reason why non-family firms should display a higher level of slack than family firms. They argue that slack is created due to the fact that managers of non-family firms need to create slack resources to hide bad business decisions and to ensure stable performance over time. This argument is also supported by agency theory stating that slack is one of the dysfunctional behaviors of agents that is due to information asymmetry between principals and agents. In contrast to managers of non-family firms, family managers need not hide bad performance since they are by definition also owners of the firm. However, taking a stewardship perspective, Le Breton-Miller et al. (2011) argue that family firms display a long-run perspective and benefit from patient capital. Furthermore, family firms build slack resources and minimize dividend payments (Dreux 1990; Kirzner 1979; Le Breton-Miller et al. 2011). In a similar vein, Carney and Gedajlovic (2002) argue that family firms need to keep slack resources for two main purposes: first of all, slack resources help family managers manage their own risk exposure and secondly slack resources are vital for family firms in order to pursue their flexible and opportunity-driven investment strategies (Carney and Gedajlovic 2002).

Organizational learning

Moores (2009) points out that there are not many applications of learning theory to family business research. Nevertheless, he argues that due to longer CEO-tenures, networking capabilities and appreciation for traditions and history family firms might have an advantage in acquiring, spreading, interpreting and remembering knowledge (Moores 2009). Furthermore, family firms also display other idiosyncrasies that foster learning (e.g. affective commitment of owners, managers, and employees (Chrisman et al. 2009), a stewardship culture (Miller et al. 2008), accumulation of social capital (Sorenson et al. 2009), and long-term orientation (Arregle et al. 2007 etc.)). In a similar vein, Vallejo (2008) demonstrates that family firms have employees that are more loyal, more involved and identify themselves more with the family firm compared to non-family firms. Furthermore, family firms are characterized by having a better work atmosphere, more trust between individuals and a greater organizational harmony (Vallejo 2008). These idiosyn-

crasies of family firms thus might give them an advantage over non-family firms in terms of creating an atmosphere that is conducive to organizational learning.

Flexibility

According to Damanpour (1991), flexibility and less use of formalized work rules foster innovation (Damanpour 1991; Bolwijn and Kumpe 1990; Burns and Stalker 1961; Thompson 1965; Aiken and Hage 1971). With regard to flexibility several authors argue that family firms display more flexible working practices (Goffee and Scase 1985) and that their business owners display a management style that maximizes flexibility and quick decision-making (Poza et al. 1977; Ward 1997). In a similar vein, Naldi et al. (2007, p. 41) argue that family firms have the ability *"to make decisions, invest in projects and pursue new ventures in a more informal, intuitive and less calculated way"*. Carney (2005, p. 23) also underlines the flexibility of family firms by stating that they *"have greater latitude to allocate resources on the basis of "animal spirits" or "gut feel" and to pursue opportunities that can only be rationalized by particularistic or intuitive criteria"*.

Long-term orientation

According to Quinn (1988), firms that exhibit a long-term strategic orientation rather than a short-term orientation are more likely to be innovative. Extant literature underscores the fact that family firms are characterized by an overlap of different subsystems (the family, the company and the family members) which in turn can cause synergies and competitive advantage that positively affect overall success (e. g. Habbershon et al. 2003; Tagiuri and Davis 1996). These interactions help them adopt strategies that emphasize goals like continuity, stability, sustainability and long-term orientation (Mishra and McConaughy 1999; Jorissen et al. 2005). This long-term orientation is also reflected in the fact that family firms tend to take a long-term perspective when deciding about strategic investment projects (Le Breton-Miller and Miller 2006). This perspective is also supported by Arregle et al. (2007) and Harris et al. (1994), who point out that family firms usually draw on patient capital and place more emphasis on long-term success rather than short-term results.

External communication

Damanpour (1991) highlights that innovative organizations engage in an effective exchange of information with their environments (Tushman 1977). In the family business literature the concept of social capital has been used to underscore that family firms might be better able to build effective relationships with stakeholders (Sirmon and Hitt 2003; Le Breton-Miller and Miller 2006). Furthermore, Sirmon and Hitt (2003) point out that the long-term horizon and patient capital of family firms often better enable them to invest in establishing and keeping stakeholder relationships compared to their non-family peers. In a similar vein, Lyman (1991) points out that family firms' relationships with stakeholders tend to be stronger and more value-laden. Drawing on their social capital, family firms can gain knowledge from their interorganizational networks in order to access information and generate knowledge about technological and market trends (Le Breton-Miller and Miller 2006; Chrisman et al. 2009; Lichtenthaler and Muethel 2012). Based on the observation that family firms tend to have stronger and more trustful relationships with

Figure 1: Research model for hypothesis 1

their stakeholders compared to non-family firms they might also more often engage in communication with their external stakeholders in order to scan the environment for innovation stimuli.

Based on this literature review that addresses the overlap between drivers of innovation and family firm characteristics, we propose that family firms differ from non-family firms with regard to these drivers of innovation. Put differently, we propose that family involvement displays an effect on the drivers of innovation.

H1: There is a difference between family firms and non-family firms with regard to the aforementioned drivers of innovation.

As mentioned before, there are contradictory results with regard to the effect of family involvement on innovativeness (De Massis et al. 2013). These contradictory findings are also present in papers that compare the performance of family firms and non-family firms. Whereas some authors hint at performance diffeences, other scholars do not find empirical support for such differences (Anderson and Reeb 2003; Demsetz and Villalonga 2001; Jaskiewicz et al. 2005; Sciascia and Mazzola 2008). A reason for these contradictory findings might be that *"research on this subject fails to clearly differentiate the family effect from other variables that may influence firm performance"* (Dyer 2006, p. 253). Some researchers argue that a firm is a family business due to its behavior, which is different from that of non-family firms (Chua et al. 1999). Arguing along this line of reasoning and drawing on the resource-based view of the firm, Habbershon et al. (2003, p. 458) develop a resource-based unified systems perspective that follows the logic that *"systemic family influence creates the potential for advantage and corresponding performance outcomes"*. Similarly, this idea is also reflected in the work of other scholars in family business research, who suggest that family involvement causes family-specific capabilities and that these capabilities lead to competitive advantage, which then leads to increased performance (Pearson et al. 2008; Chrisman et al. 2003). Dyer (2006) as well as Miller and Le Breton-Miller (2006) propose similar models where family involvement causes certain activities, processes and capabilities, which then in turn affect firm performance. Transferring this logic to investigate the influence of family involvement on innovativeness, De Massis et al. (2013, p. 23) state that *"family involvement may influence the role of multiple factors as precursors of superior outcomes in new product development"*. We thus draw on prior models and follow the same structure in the sense that family involvement causes certain behaviors (drivers of innovation), which in turn affect competitive advantage (in our case we look at innovativeness as one form of competitive advantage). Our model, however, is not complete since we do not investigate performance implications.

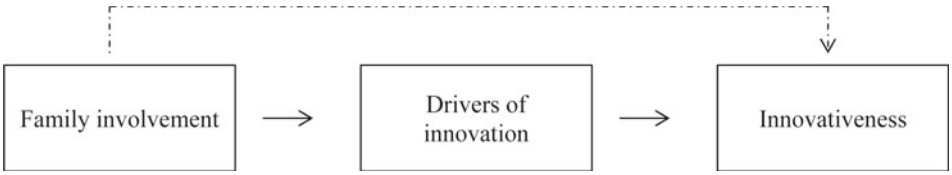

Figure 2: Research model for hypothesis 2

We thus propose a mediation model that from a logical point of view is similar to the models of Dyer (2006) and Miller and Le Breton-Miller (2006). Family involvement influenes the drivers of innovation and these drivers then in turn impact innovativeness.

H2: Drivers of innovation mediate the relationship between family involvement and innovativeness.

4 Research design, data collection and statistical methods used

The sample was selected from the KSV 1870 database (Austria's largest association for the protection of creditors), with the selection restricted by criteria regarding size, location and industry. In fact, the sample was limited to firms that are headquartered in Austria and have a headcount of over 200. Furthermore, public and non-profit organizations that do not directly pursue the aim of profit maximization were excluded. A total of 1,568 potential respondents that fulfill these selection criteria, were identified in the database of the KSV and manually checked for suitability. The instrument was administered postally to the 1,406 CEOs, who were three weeks after delivery again contacted by means of a reminder letter. Within one month 184 completed surveys were returned, which results in a response rate of 13.1%. The sample consists of 128 non-family firms and 56 family firms.

In this paper we use a survey instrument to elaborate on the research questions. The questionnaire consists of approximately 120 closed questions. Measures for the variables (see Appendix) were adapted from prior research as far as possible. In order to measure the innovativeness of a firm we used a construct developed by Lichtenthaler (2009). Additionally, several drivers of innovation were measured: long-term orientation (Le Breton-Miller and Miller 2006), flexibility (Heide and John 1992), organizational learning (Kale et al. 2000), slack (Tan and Peng 2003), internal communication (Greenley et al. 2005), organizational culture (Denison 2000), technical knowledge resources (Terziovski 2010), managerial attitude toward change (Kellermanns and Eddleston 2006), centralization (Andersen 2004), formalization (Andersen 2004) and professionalism (Bhattacharya et al. 2005). In order to measure external communication we adapted a construct from Greenley et al. (2005).

The constructs were operationalized through 1 to 6 items. The response format for each item was a seven-point scale anchored by 1 = does not apply at all and 7 = applies fully.

As control variables we used perceived environmental uncertainty, industry affiliation, organizational size, age, exploration and exploitation. Environmental uncertainty was measured according to Moers (2006). Organizational size was measured by the logarithm of the employees and as a measure for industry affiliation we divided the sample into production and non-production companies. Strategy (exploration/exploitation) was measured according to He and Wong (2004). Age was calculated as 2012 minus date of inception.

With the exception of slack and long-term orientation, the relevant variables for this study were measured using multiple items that represent latent variables. Reliability and validity were assessed using Cronbach's alpha (Carmines and Zeller 1979). Furthermore, an exploratory factor analysis was used to assess the construct validity of the variables. As can be seen in table 1, the factor loadings of all items exceed the threshold value of 0.6 and can thus be considered as appropriate (Hair et al. 2006). With regard to Cronbach's alpha all the multi-item constructs (with the exception of environmental uncertainty) show acceptable levels (Chow et al. 1999; Nunnally 1978). In accordance with the procedures described by Williams and Hazer (1986), manifest indicators for each latent variable were created by averaging the items for each scale.

In order to test for the presence of a possible non-response-bias, early and late responding companies were compared with regard to mean differences on the items used in this study (Armstrong and Overton 1977). The results suggest that non-response-bias is not a threat to the validity of our results.

Another potential problem of the survey design used is common method bias (Podsakoff et al. 2003). One way to address common method bias is to use Harman's single-factor test. This test comprises an exploratory factor analysis with all items used. The basic assumption is that if there is a substantial amount of common method variance present, either a single factor will emerge from the analysis or one general factor will account for the majority of the covariance among the measures (Podsakoff et al. 2003; Chang et al. 2010). In line with this, Harman's one factor test was conducted using the 49 survey items in an exploratory factor analysis. The results revealed twelve factors with Eigenvalues > 1. The first factor explains 32.885% of the total variance (Podsakoff & Organ, 1986). Overall, the results do not indicate the presence of significant common method bias.

In accordance with previous research (e.g. Carrasco-Hernandez and Sanchez-Marin 2007; Kotey 2005; Zahra 2010), MANCOVA and ANCOVA will be conducted to empirically test hypothesis 1. Multivariate analysis of covariance (MANCOVA) is a statistical technique that can be used to investigate the effect of independent variables measured on two or more dependent variables. Multivariate analysis of covariance is used when the independent variables are non-metric, nominal, or ordinal in nature (Bracker et al. 1988, p. 596). It is used *"to assess group differences across multiple metric dependent variables simultaneously*" (Hair et al. 2006, p. 383). Furthermore, MANCOVA incorporates the usage of covariates that are integrated as control variables for the independent factors (Garson, 2008; Hair et al. 2006). MANCOVA, however, only provides a means for rejecting the overall null hypothesis. It does not specify where the significant differences lie (Bracker et al. 1988). In our case MANCOVA thus only investigates whether there is a significant difference between family firms and non-family firms across all drivers of in-

novation as proposed in hypothesis 1. When the results of MANCOVA are significant, ANCOVA (i.e. analysis of covariance) is used to identify sources of differences between the groups (Zahra 2010). In order to better understand where family firms differ from non-family firms in terms of drivers of innovation we thus also make use of ANCOVA.

In order to test hypothesis 2, which proposes a mediation effect, we employ two different analyses. Analysis 1 uses in the first and third steps ANCOVA to test the effect of family involvement on innovativeness and in the second step makes use of propensity score matching (PSM) to test the mediation effect of the drivers of innovation. PSM is a relatively new technique (Rosenbaum and Rubin 1983) that has benefits over more traditional methods of mediation analysis (Coffman 2011). Most important of all, PSM estimates the propability (i.e. propensity score) that an individual receives the treatment given measured confounders (Coffman 2011). The advantage of PSM is then that it reduces a large number of potential confounders into a single propensity score (Coffman 2011). Based on these propensity scores individuals with treatment are matched to individuals without treatment in a way that their respective propensity scores are as similar as possible. Through this matching procedure, a large number of confounders are implicitly controlled for and thus comparisons between treatment groups and control groups on an outcome variable are more suited to isolate the treatment effect (Coffman 2011). PSM is therefore one way to address concerns voiced in extant research on family business. Dyer (2003) and Westhead and Cowling (1998) underscore the importance of using matched-pair approaches when comparing family and non-family firms in order to isolate the family effect.

For the purpose of our study we make use of PSM in the following way. In our context the treatment variable is being a family firm or not. Consequently, our treatment group includes family firms while our control group consists of non-family firms. As confounding variables we use the drivers of innovation that display significant differences between family firms and non-family firms (i.e. technical knowledge resources, slack, flexibility, organizational learning, long-term orientation and external communication) as well as size, age, industry affiliation, exploration, exploitation and perceived environmental uncertainty. Next we estimate the propensity score for every company in our sample (i.e. the proability of being a family firm given the confounders).

We use a probit regression and in doing so we estimate the conditional probability (i.e. propensity score) of a firm being a family firm given observed firm characteristics. These firm characteristics include all drivers of innovation that exhibit a significant difference between family firms and non-family firms as well as the control variables used in this study.

Based on these propensity scores, we then create pairs of a family and a non-family firm in a way they both have approximately the same probability of being a family firm given their confounders. In line with Höppe and Moers (2011) we use a maximum difference between the propensity scores of a family firm and a non-family firm of one percentage point. This matching procedure finally results in 35 pairs (a family firm and a non-family firm for each pair) that are almost similar along the matching criteria used (significant drivers of innovation and control variables). This basically means that both firms of each matched pair are very similar with regard to the level of the significant drivers of innovation and the control variables.

In the final step of analysis 1 we again perform an ANCOVA to analyze differences between family firms and non-family firms with regard to innovativeness. Contrary to step 1, now we only make use of the matched sample and do not use control variables since they are accounted for by the matching procedure. If the significant difference in innovativeness between family firms and non-family firms still remains, this implies that there is no mediation effect of the significant drivers of innovation. If the significant effect, however, disappears, we find support that the difference in innovativeness is not driven by family involvement but rather by the consequences of family involvement (i.e. drivers of innovation). This scenario would then correspond to a mediation effect as proposed in prior family business literature (Dyer 2006; Miller and Le Breton-Miller 2006).

To check the robustness of our results we also employ a traditional method of testing mediation models as proposed by Baron and Kenny (1986). In line with Baron and Kenney (1986), we use regression analysis and take the following steps. First, we test the significance of the effect of family involvement on the mediator (in our case the significant drivers of innovation). Second, we test whether family involvement significantly influences the dependent variable, in our case innovativeness. Third, we estimate a regression equation in order to determine the significance of the effect of the mediator on innovativeness. Fourth, we run a regression with family involvement and the mediator as independent variables and innovativeness as dependent variable. In the fourth step the mediator must display a significant effect on the dependent variable. The strongest mediation effect occurs when a previously significant relationship between indenpendent variable (family involvement) and dependent variable (innovativeness) becomes less significant and the regression coefficient of the independent variable is reduced to 0 (Baron and Kenney 1986). When the effect of family involvement on innovativeness is reduced

Table 2: Summary of survey constructs

Construct	Number of Items	Range of factor loadings	Cronbach's Alpha
Professionalism	3	0.781-0.948	0.863
Formalization	3	0.817-0.890	0.806
Centralization	3	0.863-0.925	0.884
Managerial attitude toward change	2	0.903-0.903	0.772
Technical knowledge resources	5	0.733-0.853	0.861
Organizational culture	6	0.751-0.855	0.897
Internal communication	2	0.883-0.883	0.717
Slack	1		
Organizational learning	4	0.737-0.859	0.802
Flexibility	3	0.760-0.837	0.737
Long-term orientation	1		
External communication	3	0.748-0.854	0.742
Innovativeness	3	0.900-0.915	0.893
Exploration	3	0.773-0.830	0.728
Exploitation	3	0.789-0.851	0.738
Perceived environmental uncertainty	4	0.610-0.766	0.638

to 0 this hints at the presence of a single dominant mediator. If the effect however is not 0, this indicates the presence of multiple mediators (Baron and Kenney 1986). Furthermore, we also employ the Sobel's (1982) test in order to test the significance of the indirect effect. Additionally, in line with James and Brett (1984), we analyze the adjusted R^2 in order to investigate the presence of a mediation effect. We analyze the change in the explanatory power of the model when we also include the mediator. In the case of mediation the inclusion of the mediator enhances the adjusted R^2, while the inclusion of the independent variable does not add any predictive power (James and Brett 1984). We run this mediation analysis for the six drivers of innovation we found significant differences for.

5 Results

Table 3 reports the means and standard deviations for the drivers of innovation, innovativeness and the control variables for both non-family and family firms.

In order to test hypothesis 1 MANCOVA is used. Family firms and non-family firms are compared along the proposed drivers of innovation (see table 4). In line with previous literature, organizational size, age, industry affiliation, exploration, exploitation and perceived environmental uncertainty are included in the analysis as control variables (Crossan and Apaydin 2010; Rogers 1983; Zahra 2005; Freel 2005; Tidd 2001).

Our findings in table 4 indicate that across all the drivers of innovation in our model there is a significant difference between family firms and non-family firms (Pillai's Criterion, Wilks Lambda, Hotellings's Trace and Roy's Largest Root have F-values of 2.482 and p-values of 0.005). Furthermore, exploration and exploitation yield highly significant results. Therefore, we find empirical support for hypothesis 1, stating that there is a difference between family firms and non-family firms with regard to the proposed drivers of innovation.

In order to find out along which drivers of innovation family firms differ significantly from their non-family peers, ANCOVA is used (results reported in table 5). Our results reveal that significant differences exist for the following drivers: technical knowledge resources, slack, organizational learning, flexibility, long-term orientation and external communication.

With regard to technical knowledge resources we find a significant effect of family involvement ($F = 5.207$; $p = 0.024$). Family firms (mean = 5.05; standard deviation = 1.08) display a significantly higher level of technical knowledge resources compared to non-family firms (mean = 4.69; standard deviation = 1.23). Furthermore, family firms have significantly higher slack (mean = 4.89; standard deviation = 1.70) ($F = 6.653$; $p = 0.011$) compared to non-family firms (mean = 4.18; standard deviation = 1.71). We also found significant differences with regard to organizational learning ($F = 4.197$; $p = 0.042$). Our statistical findings show that family firms (mean = 4.98; standard deviation = 1.16) display significantly higher organizational learning compared to non-family firms (mean = 4.63; standard deviation = 1.17). With regard to flexibility we also find significant differences ($F = 6.622$; $p = 0.011$), with family firms (mean = 5.40; standard deviation = 1.10) being more flexible than their non-family peers (mean = 4.98; standard deviation =

Table 3: Descriptive statistics for survey constructs

Constructs	Non-family firms (NFF), n = 128; mean (standard deviation)	Family firms (FF), n = 56; mean (standard deviation)
Professionalism	5.14	5.02
	(0.99)	(1.27)
Formalization	5.23	5.18
	(1.16)	(1.25)
Centralization	5.81	5.74
	(1.02)	(1.24)
Managerial attitude toward change	5.75	5.80
	(1.03)	(1.23)
Technical knowledge resources	4.69	5.05
	(1.23)	(1.08)
Organizational culture	5.41	5.37
	(1.02)	(1.12)
Internal communication	5.35	5.52
	(1.05)	(1.19)
Slack	4.18	4.89
	(1.71)	(1.70)
Organizational learning	4.63	4.98
	(1.17)	(1.16)
Flexibility	4.98	5.40
	(1.11)	(1.10)
Long-term orientation	5.90	6.21
	(1.17)	(1.20)
External communication	4.79	5.13
	(1.26)	(1.24)
Innovativeness	4.89	5.39
	(1.23)	(1.18)
Size	2.70	2.67
	(0.31)	(0.36)
Age	61.60	59.29
	(68.66)	(41.75)
Exploration	4.55	4.65
	(1.06)	(1.28)
Exploitation	5.33	5.38
	(1.27)	(1.23)
Perceived environmental uncertainty (PEU)	3.74 (0.86)	3.80 (0.75)

1.11). Family firms (mean = 6.21; standard deviation = 1.20) are also significantly more long-term oriented (F = 2.804; p = 0.096) compared to non-family firms (mean = 5.90; standard deviation = 1.17). Finally, we also find significant differences with regard to external communication (F = 3.140; p = 0.078). Family firms (mean = 5.13; standard deviation = 1.24) display a higher level of external communication in comparison to non-family firms (mean = 4.79; standard deviation = 1.26).

With regard to professionalism we do not find a significant difference between non-family firms (mean = 5.14; standard deviation = 0.99) and family firms (mean = 5.02; standard deviation = 1.27). The direction of the results, however, is in line with previous literature. Furthermore, family firms (mean = 5.18; standard deviation = 1.25) do not display significantly lower formalization than non-family firms (mean = 5.23; standard deviation = 1.16). The direction of the results is again in line with previous research. However, the difference is very small, which might be due to the fact that firms in our sample are relatively large (200 or more employees). Therefore, the positive effect of size on formalization might dominate the negative effect of family involvement.

The same applies to internal communication. Despite the fact that there is no significant difference between family firms (mean = 5.52; standard deviation = 1.19) and non-family firms (mean = 5.35; standard deviation = 1.05), the descriptive results show that family firms on average tend to communicate more internally.

In terms of centralization, managerial attitude toward change and organizational culture we do not find significant effects either. Interestingly enough, for all three drivers the direction of the results is not necessarily what one would expect based on previous literature. In the case of managerial attitude toward change, family firms (mean = 5.80; standard deviation = 1.23) display a slightly higher value than non-family firms (mean = 5.75; standard deviation = 1.03). This finding might be explained by the fact that later-generation family firms have also been found to embrace change (Kepner 1991; Salvato 2004; Kellermanns and Eddleston 2006; Kellermanns et al. 2008). The same effect of later-generation family involvement might also explain why family firms (mean = 5.74; standard deviation = 1.24) display a slightly lower level of centralization compared to non-family firms (mean = 5.81; standard deviation = 1.02). Despite the fact that we controlled for age, which can be assumed to be a reasonable proxy for generational effects, there might be some variance that cannot be explained through the use of age as covariate. Furthermore, these results might be driven to a certain extent by the fact that the firms in our sample are relatively large (200 or more employees). With regard to organizational culture both family firms (mean = 5.37; standard deviation = 1.12) and non-family firms (mean = 5.41; standard deviation = 1.02) display very similar levels.

As described in section 4, we use two different approaches to test hypothesis 2. Our first analysis consists of three different stages. First of all, we run an ANCOVA to test the direct effect of family involvement on innovativeness while controlling for the effects of size, age, industry affiliation, exploration, exploitation and perceived environmental uncertainty. Our findings (reported in table 6) indicate significant differences ($F = 8.488$; $p = 0.004$) between family firms (mean = 5.39; standard deviation = 1.18) and non-family firms (mean = 4.89; standard deviation = 1.23). Descriptive statistics show that non-family firms exhibit less innovativeness than their peer family firms. When controlling for size ($F = 2.427$; $p = 0.121$), age ($F = 1.965$; $p = 0.163$), industry ($F = 0.567$; $p = 0.452$), exploration ($F = 54.507$; $p = 0.000$), exploitation ($F = 9.615$; $p = 0.002$) and perceived environmental uncertainty ($F = 0.035$; $p = 0.852$), there are significant differences for the innovativeness of firms that can be explained by family involvement. Thus, this initial results hint at a significant direct effect of family involvement on innovativeness.

Secondly, we estimate the conditional probability (i.e. propensity score) of a firm being a family firm given observed firm characteristics. These firm characteristics in-

Table 4: Results of MANCOVA for hypothesis 1

Independent variables	FF vs. NFF		Size		Age		Industry affiliation		Exploration		Exploitation		PEU	
	F	p	F	p	F	p	F	p	F	p	F	p	F	p
Pillai's Criterion	**2.482**	**0.005*** **	0.929	0.520	0.664	0.784	0.672	0.777	**24.743**	**0.000*** **	**2.956**	**0.001*** **	0.871	0.578
Wilks Lambda	**2.482**	**0.005*** **	0.929	0.520	0.664	0.784	0.672	0.777	**24.743**	**0.000*** **	**2.956**	**0.001*** **	0.871	0.578
Hotelling's Trace	**2.482**	**0.005*** **	0.929	0.520	0.664	0.784	0.672	0.777	**24.743**	**0.000*** **	**2.956**	**0.001*** **	0.871	0.578
Roy's Largest Root	**2.482**	**0.005*** **	0.929	0.520	0.664	0.784	0.672	0.777	**24.743**	**0.000*** **	**2.956**	**0.001*** **	0.871	0.578

*** significant for the level $p < 0.01$; ** significant for the level $p < 0.05$; * significant for the level $p < 0.1$

Table 5: Results of ANCOVA for hypothesis 1

Factor/ Control variable	Professionalism	Formalization	Centralization	Attitude Change	Technical knowledge resources	Organizational Culture	Internal Communication	Slack	Organizational learning	Flexibility	Long-term orientation	External Communication
FF vs. NFF	F = 0.554 p = 0.458	F = 0.310 p = 0.579	F = 0.165 p = 0.685	F = 0.102 p = 0.749	**F = 5.207**** **p = 0.024**	F = 0.222 p = 0.638	F = 0.931 p = 0.336	**F = 6.653**** **p = 0.011**	**F = 4.197**** **p = 0.042**	**F = 6.622**** **p = 0.011**	**F = 2.804*** **p = 0.096**	**F = 3.140*** **p = 0.078**
Size	F = 0.515 p = 0.474	F = 1.644 p = 0.201	F = 0.850 p = 0.358	F = 0.594 p = 0.442	F = 1.319 p = 0.252	F = 0.027 p = 0.870	F = 0.719 p = 0.398	F = 1.382 p = 0.241	F = 0.052 p = 0.820	F = 1.378 p = 0.242	F = 0.232 p = 0.631	F = 0.068 p = 0.794
Age	F = 0.338 p = 0.562	F = 0.011 p = 0.918	F = 0.900 p = 0.344	F = 0.053 p = 0.818	F = 1.080 p = 0.300	F = 0.618 p = 0.433	F = 2.326 p = 0.129	F = 0.929 p = 0.336	F = 0.053 p = 0.817	F = 0.239 p = 0.626	F = 1.526 p = 0.218	F = 0.006 p = 0.936
Industry affiliation	F = 1.737 p = 0.189	F = 0.268 p = 0.605	**F = 2.727*** **p = 0.100**	**F = 3.398*** **p = 0.067**	F = 0.023 p = 0.879	F = 1.455 p = 0.229	F = 2.280 p = 0.133	F = 0.018 p = 0.893	F = 0.130 p = 0.718	F = 1.658 p = 0.020	F = 0.219 p = 0.640	F = 0.750 p = 0.388
Exploration	**F = 24.997*** **p = 0.000**	**F = 36.492*** **p = 0.000**	**F = 45.009*** **p = 0.000**	**F = 63.264*** **p = 0.000**	**F = 166.290*** **p = 0.000**	**F = 57.862*** **p = 0.000**	**F = 30.522*** **p = 0.000**	**F = 4.951**** **p = 0.027**	**F = 93.840*** **p = 0.000**	**F = 71.312*** **p = 0.000**	**F = 13.768*** **p = 0.000**	**F = 58.121*** **p = 0.000**
Exploitation	**F = 3.726*** **p = 0.055**	**F = 15.628*** **p = 0.000**	F = 2.300 p = 0.131	**F = 4.089**** **p = 0.045**	**F = 24.607*** **p = 0.000**	**F = 8.815*** **p = 0.003**	F = 1.383 p = 0.241	F = 1.845 p = 0.176	**F = 6.792**** **p = 0.010**	**F = 3.205*** **p = 0.075**	F = 0.072 p = 0.788	**F = 11.339*** **p = 0.001**
PEU	F = 0.005 p = 0.941	F = 0.156 p = 0.694	F = 1.233 p = 0.268	**F = 3.335*** **p = 0.070**	F = 0.455 p = 0.501	F = 0.020 p = 0.887	F = 0.362 p = 0.548	F = 0.254 p = 0.615	F = 2.724 p = 0.101	F = 0.579 p = 0.448	F = 0.210 p = 0.647	F = 0.571 p = 0.451

*** significant for the level $p < 0.01$; ** significant for the level $p < 0.05$; * significant for the level $p < 0.1$

Table 6: Results for direct effect of family involvement on innovativeness (H2)

Factor/Control variable	F-Value	P-value
Family Firm vs. Non-Family Firm	**8.488*** **	**0.004**
Size	2.427	0.121
Age	1.965	0.163
Industry affiliation	0.567	0.452
Exploration	**54.507*** **	**0.000**
Exploitation	**9.615*** **	**0.002**
PEU	0.035	0.852

*** significant for the level $p < 0.01$; ** significant for the level $p < 0.05$

clude all drivers of innovation that exhibit a significant difference between family firms and non-family firms (i.e. technical knowledge resources, slack, flexibility, organizational learning, long-term orientation and external communication), as well as the control variables used in this study (i.e. size, age, industry affiliation, exploration, exploitation and perceived environmental uncertainty).

The matching procedure results in 35 pairs. To find out whether these pairs are indeed similar along these chosen firm characteristics, we perform an analysis of variance for differences in the means of the firm characteristics (significant drivers of innovation) and control variables between family and non-family firms. No statistically significant differences can be found, which consequently suggests that all 35 non-family firms in our sample behave very similarly to the 35 family firms along the chosen matching criteria. Another way to interpret this is that for one matched pair of two firms both firms have ex-ante (i.e. given their firm characteristics) the same probability of being a family firm. The matching thus creates a sample in which the 35 non-family firms differ from their partners only in the sense that they are not family firms. The matching procedure can also be interpreted in the sense that it implicitly controls for the effects of the drivers of innovation on innovativeness and therefore it isolates the "family effect" on innovativeness (similarly, Dyer (2006) employs the exact same logic for performance as dependent variable).

Thirdly, in order to shed more light on the question whether family involvement displays a direct effect on innovativeness or whether the drivers of innovation serve as mediators, we perform an analysis of variance for the matched sample to test for mean differences with regard to innovativeness. We do not make use of control variables since they have already been considered in the matching procedure. The results of this analysis reveal that the significant difference with regard to innovativeness ($F = 1.120$; $p = 0.293$) between family firms (mean = 5.41; standard deviation = 1.07) and non-family firms (mean = 5.14; standard deviation = 1.17) is no longer there (see table 7). Put differently, these non-family firms that behave similarly to family firms do not display a significantly lower innovativeness. In this sense our results provide some evidence that the drivers of innovation chosen (i.e. technical knowledge resources, slack, flexibility, organizational learning, long-term orientation and external communication) account for a significant amount of variation of the variable innovativeness. Furthermore, it supports our hypothesis that family involvement does not directly but rather indirectly influence innovative-

Table 7: Results for direct effect of family involvement on innovativeness for matched sample (H2)

Factor/Control variable	F-Value	P-value
Family Firm vs. Non-Family Firm	1.120	0.293

*** significant for the level $p < 0.01$; ** significant for the level $p < 0.05$

ness through activities, processes and capabilities (i.e. in our case the significant drivers of innovation).

Furthermore, we also apply the typical causal steps approach as proposed by Baron and Kenney (1986) as well as James and Brett (1984) in order to test hypothesis 2 (see table 8). We run the analysis for the significant drivers of innovation. For each driver of innovation our model consists of four regressions. First of all, we test for the significance of the effect of family involvement on our mediating variables (model 3). Our results reveal that for each of these drivers there is a significant effect of family involvement (in other words, there is a significant difference between family firms and non-family firms). Secondly, we regress innovativeness on family involvement and find a significant effect ($\beta = 0.531$; $p = 0.005$) (model 1). Thirdly, we test the effect of the mediators on innovativeness and find consistently significant results (model 2). In our final step we estimate regression models using both the family involvement and mediator variables as independent variables (model 4). For a mediation to be present, the effect of family involvement on innovativeness when also including the mediator has to decrease in terms of both strength and significance. Generally, the effect of family involvement on innovativeness becomes weaker when including the mediator variables (technical knowledge resources: β changes from 0.531 to 0.273; slack: β changes from 0.531 to 0.374; organizational learning: β changes from 0.531 to 0.327; flexibility: β changes from 0.531 to 0.361; long-term orientation: β changes from 0.531 to 0.466; external communication: β changes from 0.531 to 0.352). In all the cases the regression coefficients for family involvement do not change to 0, which indicates the operation of multiple mediating factors (Baron and Kenney 1986). This is actually supported by the fact that we do not single out one driver of innovation but instead investigate the role of six drivers of innovation.

Another requirement for mediation is that the effect of family involvement on innovativeness decreases in significance/loses its significance when including the mediator variables. Despite the fact that the significance of family involvement does not disappear, our results indicate that the effects become weaker (technical knowledge resources: p-value changes from 0.005 to 0.053; slack: p-value changes from 0.005 to 0.041; organizational learning: p-value changes from 0.005 to 0.042; flexibility: β changes from 0.005 to 0.044; long-term orientation: β changes from 0.005 to 0.013; external communication: β changes from 0.005 to 0.031). The reason why the significance of family involvement does not disappear is that multiple mediators are at work (Baron and Kenney 1986).

Another indication of a mediation effect is that the inclusion of the mediator in the model increases the explanatory power of the model (model 4) compared to the baseline model (model 1), where only family involvement is used to predict innovativeness (technical knowledge resources: Adj. R^2 increases from 0.118 to 0.516; slack: Adj. R^2 increases from 0.118 to 0.202; organizational learning: Adj. R^2 increases from 0.118 to 0.376;

Table 8: Mediation analysis for H2

	Technical knowledge resources		Slack		Organizational learning		Flexibility		Long-term orientation		External communication	
Regression paths/ models	β	p-value	β	p-value	β	p-value	β	p-value	β	p-value	β	p-value
1) Family → innovativeness	**0.531*** **	**0.005**	**0.531*** **	**0.005**	**0.531*** **	**0.005**	**0.531*** **	**0.005**	**0.531*** **	**0.005**	**0.531*** **	**0.005**
2) Driver → innovativeness	**0.735*** **	**0.000**	**0.235*** **	**0.000**	**0.586*** **	**0.000**	**0.420*** **	**0.000**	**0.214*** **	**0.004**	**0.524*** **	**0.000**
3) Family → driver	**0.359** **	**0.043**	**0.731*** **	**0.009**	**0.360** **	**0.047**	**0.433** **	**0.014**	**0.341* **	**0.078**	**0.353** **	**0.069**
4) Family and driver innovativeness	**β (family) = 0.273** **	**0.053**	**β (family) = 0.374** **	**0.041**	**β (family) = 0.327** **	**0.042**	**β (family) = 0.361** **	**0.044**	**β (family) = 0.466** **	**0.013**	**β (family) = 0.352** **	**0.031**
	β (driver) = 0.717* **	**0.000**	**β (driver) = 0.215*** **	**0.000**	**β (driver) = 0.566*** **	**0.000**	**β (driver) = 0.392*** **	**0.000**	**β (driver) = 0.190*** **	**0.009**	**β (driver) = 0.506*** **	**0.000**
Adj. R^2 for model 1	0.118		0.118		0.118		0.118		0.118		0.118	
Adj. R^2 for model 2	0.508		0.188		0.365		0.218		0.122		0.341	
Adj. R^2 for model 3	0.170		0.037		0.094		0.078		0.000		0.106	
Adj. R^2 for model 4	0.516		0.202		0.376		0.231		0.147		0.355	
Difference between 1 and 4 with regard to Adj. R^2	0.398		0.084		0.258		0.113		0.029		0.237	
Sobel test for mediation	Test-statistic	p-value	Test-statistic	p-value	Test-statistic	p-value	Test-statistic	p-value	Test-statistic	p-value	Test-statistic	p-value
	2.013 **	**0.044**	**2.330** **	**0.020**	**1.951* **	**0.051**	**2.274** **	**0.023**	1.525	0.127	**1.788* **	0.073

*** significant for the level $p < 0.01$; ** significant for the level $p < 0.05$; * significant for the level $p < 0.1$; Age, size, industry, strategy and perceived environmental uncertainty are included as control variables in our regression models.

flexibility: Adj. R^2 increases from 0.118 to 0.231; long-term orientation: Adj. R^2 increases from 0.118 to 0.147; external communication: Adj. R^2 increases from 0.118 to 0.355).

In order to assess the significance of the indirect effect we also compute the Sobel (1982) test[3]. The results indicate that our mediation model works quite well for five of our drivers of innovation, with the exception of long-term orientation (p-value = 0.127). This is also evidenced by the fact that in the case of long-term orientation the regression coefficient for family involvement (from 0.531 to 0.466) and the Adj. R^2 (from 0.118 to 0.147) hardly change.

To dig deeper into our analysis, we also estimate a regression model with innovativeness as dependent variable and family involvement and all the significant drivers together as independent variables (results are not reported in table 8). The results of the analysis further corroborate the contention that multiple factors mediate the relationship between family involvement and innovativeness. The regression coefficient of family involvement drops to 0.200 (considerably lower than all coefficients for family involvement reported in table 8 under model 4) and loses its significance (p-value = 0.145).

Comparing the results of our two different approaches we can see that both analyses yield almost the same results, with method one being more holistic in the sense that the mediation model is tested by using propensity score matching, which makes it possible to consider serveral confounding variables simultaneously (Coffman 2011). They both show that family involvement is mediated to a certain extent by the six drivers of innovation. However, looking at the results we see that in both cases there remains a non-significant differential with regard to the innovativeness of family and non-family firms (in analysis 1 the difference is calculated as the mean difference of family firms and non-family firms for the matched sample: 5.41 – 5.14 = 0.27; in analysis 2 we can interpret the regression coefficient of family involvement as the difference between family and non-family firms: $\beta = 0.200$). If we compare these residual values to the initial descriptive difference between family and non-family firms for innovativeness (5.39 – 4.89 = 0.5), we can see that our mediation model significantly contributes to the explantation of variation in innovativeness. Nevertheless, we are also aware of the fact that there is still a residual difference that cannot be explained with our two analyses. This, however, does not come as a surprise since our model is only partial in the sense that there are many more potential factors that might influence innovativeness than we have accounted for in our model (Crossan and Apaydin 2010; Brown and Eisenhardt 1995).

6 Summary and discussion

This paper has elaborated on the issue of innovation in family firms. Based on extant family- business literature we have analyzed to what extent family firms differ from non-family firms with regard to selected drivers of innovation. Our results show that for the drivers we selected there is a significant overall difference between family and non-family firms. For the 12 drivers we chose from previous literature family firms display a significantly higher level of technical knowledge resources, slack, organizational learning, flexibility, long-term orientation and external communication. These findings indicate that family involvement seems to display an effect on certain drivers of innovation.

Our results thus shed some more light on the "black box" of innovation in family firms. In doing so, our paper extends prior qualitative papers by De Massis et al. (2013) and Cassia et al. (2012).

Secondly, our mediation analyses reveal several interesting findings. Initial results suggest that family firms are more innovative than their non-family peers. However, after controlling for the six drivers of innovation (these drivers where family firms differ significantly from non-family firms) our results reveal that the significant difference with regard to innovativeness disappears. We thus demonstrate that non-family firms that behave similarly to family firms can achieve a level of innovativeness that is similar to that of family firms. We thus show that innovation in family firms is not so much driven by family involvement per se but rather by the consequences that are caused by it (i.e. drivers of innovation). Through the use of PSM we find some evidence that multiple mediators exist through which family involvement influences innovativeness. In this sense, we extend prior family-business literature by applying conceptual mediation models that were developed to explain performance in family firms to the innovation context (Dyer 2006; Miller and Le Breton-Miller 2006).

Furthermore, our results might also provide valuable insights and recommendations for future research on innovation in family businesses. First of all, scholars should purposefully deviate from just comparing family and non-family firms because this implicitly assumes a direct effect of the family variable on innovation which is according to our results weak at best. Thus, valuable contributions can be made by digging deeper and creating models that theorize how family involvement affects drivers of innovation which in turn influence innovativeness. Secondly, our results indicate that the relationship between family involvement and innovativeness is mediated by a multitude of variables. Therefore, studies should focus not only on single drivers of innovation to predict differences between family and non-family firms. Studies that use single drivers as predictors might yield an incomplete picture and overestimate the direct effect of family involvement on innovation. Furthermore, future papers in this field might also elucidate the relationship between various drivers of innovation in order to create more comprehensive models that help us better understand innovation in both family and non-family firms.

In terms of managerial implications of this paper, based on our findings it could be suggested that managers of non-family firms might take a look at areas where family firms seem to have comparative advantages. Factors that display a positive effect on innovativeness include the following: technical knowledge resources, availability of slack resources to enable quick and opportunity-driven decision-making, flexible and intuitive decision-making style, organizational learning, long-term orientation and external communication. By focusing more on these levers, non-family firms might be able to increase their level of innovativeness.

Literature on family firms often posits that family firms behave less professionally compared to non-family firms (McEachern 1978; Schulze et al. 2001; Hall and Nordqvist 2008). Implicit in this claim is the assumption that family firms could be more successful if they behaved more similarly to non-family firms (Posch and Speckbacher 2012). More recent papers, however, suggest that the behavior of family firms might not necessarily be a consequence of a lack of professionalism but rather seems to be driven by the special conditions that characterize the family business (Posch and Speckbacher 2012; Speck-

bacher and Wentges 2012). In a similar vein the results of our paper corroborate these insights. Moreover, our findings cast doubt on the assumption often sweepingly made in extant literature that family firms can benefit from imitating management practices of non-family firms. Conversely, for the field of innovation our findings rather suggest the opposite: non-family firms might actually benefit from imitating the practices of family firms. Application of innovation frameworks that were developed for non-family firms to the group of family firms thus requires considerable thought and possible adaptations that take account of family firms' idiosyncrasies.

The results of this paper, however, have to be interpreted in the light of its limitations. The survey data used in this study were collected using a single respondent approach targeting CEOs as key informants. Furthermore, we rely on data collected in a single country, which puts limits to the generalizability of our results. The use of one respondent generally weakens the validity of the study because measures taken from only one person might contain an element of perception (Harzing and Sorge 2003; Van der Stede et al. 2005; Young 1996). Furthermore, due to the cross-sectional nature of the data set our empirical findings should be interpreted with caution since causality claims cannot be made. Another limitation of this study is the potential for common method bias. Common method bias might be especially relevant for the analysis of innovativeness since innovativeness was measured using a perceptual measure. It was thus collected from the same respondents that also provided information about the independent variables. The use of a perceptual measure of innovativeness is due to the fact that more objective data (e.g. patents) are difficult or sometimes even impossible to collect for family firms (Chenhall 2003; Handler 1989; Wortman 1994). Despite claims in literature that perceptual performance measures correlate with objective measures (Chenhall 2003) and the results of the Harman's one factor test, common method bias is still a limitation of this study.

Furthermore, our sample of family firms is relatively small compared to the sample of non-family firms. Larger sample sizes would definitely be helpful in order to increase the statistical power of our tests. Furthermore, we have used a very narrow definition of family firms. Future studies should take account of the heterogeneity that characterizes family firms and should incorporate it into their research design (De Massis et al 2013; Chua et al. 2012). In the context of our study we argue that the results will probably not change when the ownership criterion is defined in a less strict way (e.g. family ownership of 25% or more). However, we believe that the results will be rather different when the leadership criterion is not applied meaning that family firms with no family involvement in the top management team might rather behave similarly to non-family firms. The reason for this proposition is highlighted by the fact that when family members are represented on the top management team they display special behavioral dynamics that influence the firm (Ensley and Pearson 2005; Chrisman et al. 2005). Furthermore, family involvement in the top management team usually leads to the family being more involved in the daily operation of the business which in turn ensures a strong family influence (Speckbacher and Wentges 2012). If the top management team however only consists of external managers, it is likely that these firms will behave similarly to non-family firms since the family influence is considerably weaker (Dyer 2006).

With regard to the drivers of innovation investigated in this study it has to be mentioned that the list of drivers chosen is by no means exhaustive. We tried to implicitly take

account of other factors that drive innovation by employing propensity score matching. In doing so, we were able to isolate factors that explain differences in innovativeness between family firms and their non-family peers. Nevertheless, a residual difference remains that cannot be explained with our model. This, however, supports prior literature stating that there is a multitude of innovation drivers and further indicates potential for future research. In order to understand innovation processes and drivers better in the family-business context there is still a lot of work to be done. Future studies should also shed light on drivers of innovation that are typically characteristic of family firms and that have a negative influence on innovation (e.g. centralization, lower R&D expenditure compared to non-family firms, lower risk propensity). It might be interesting to find out to what extent these potential negative effects offset the positive effects we have found. This debate could further contribute to the question of whether too much family involvement can actually be negative for innovation (Pearson et al. 2008).

This paper has only touched upon the black box of the effects of family involvement on innovativeness. Although it provides several interesting insights and contributes to a recent stream of research, the insights of this paper need to be complemented by future papers that investigate the innovation process and outcomes and how they are affected by family involvement more thoroughly (De Massis et al. 2013). Research projects might elaborate in more detail on the idiosyncrasies of family firms and how they influence innovativeness. Both case studies and large-scale quantitative research studies that combine survey data and objective data on innovation seem to be well-suited paths for future inquiries.

Endnotes

1 Throughout the course of this paper the terms innovation and innovativeness are used interchangeably with one another.

2 To find out whether the relevant companies define themselves as family firms we scanned the corporate websites of the relevant firms. In the end we had two measures for family involvement, one based on ownership that exceeds 50% of ordinary voting shares and where the family is represented on the top management team and one that describes whether the companies pereceive themselves as family firms. The overlap of these two measures was tested using Pearson's correlation coefficient. We obtained a value of 0.764 which is highly significant (p-value = 0.000) and shows a very good overlap between the two measures. Overall, for 12 out of 184 companies we had a mismatch between these two measures. We conducted sensitivity analysis and the results of our models were almost identical with and without these 12 observations. Due to sample size considerations we thus decided to include these cases in our final model.

3 The Sobel test-statistic is calculated using the following formula: $z = \frac{\alpha\beta}{\sqrt{\alpha^2 \sigma_\beta^2 + \beta^2 \sigma_\alpha^2}}$ with α describing the effect of the independent variable on the mediator variable, β describing the effect of the mediator variable on the dependent variable, $\sigma^2\alpha$ describing the standard error of α and σ_β^2 describing the standard error of β. The resulting test statistic is then compared to the standard normal distribution to test for significance (Sobel 1982).

7 Appendix

Constructs

Cronb. Alpha	Mean (S.D.)	Factor loading	Items
Innovativeness (Lichtenthaler 2009)			
0.893	2.55 (1.62)	0.908	Compared with our major competitors our overall new product development program is far more successful.
	3.12 (1.58)	0.900	Compared with our major competitors our overall new process development program is far more successful.
	2.89 (1.36)	0.915	Compared with our major competitors our organization is far more innovative.
Professionalism (Bhattacharya et al. 2005)			
0.863	5.13 (1.54)	0.948	We spend more money per employee on training than our competitors.
	5.67 (1.25)	0.781	We offer many different types of training programs.
	5.55 (1.29)	0.933	Our employees spend more hours a year in training than our competitors.
Formalization (Andersen 2004)			
0.806	5.38 (1.39)	0.845	We have a framework of key processes.
	5.31 (1.26)	0.890	We manage cross-functional processes holistically.
	4.97 (1.43)	0.817	We develop and use meaningful performance indicators and process outcome measures.
Centralization (Andersen 2004)			
0.884	5.74 (1.23)	0.925	The managers follow a clear strategy for achieving the business goals.
	5.87 (1.19)	0.912	The managers have a plan for our business.
	5.79 (1.09)	0.863	The managers know what we need to do to reach the business goals.
Managerial attitude toward change (Kellermanns and Eddleston 2006)			
0.772	5.61 (1.22)	0.903	The managers in our firm actively support learning and new operation methods.
	5.97 (1.16)	0.903	The managers in our firm actively support a culture of development and innovation.
Technological knowledge resources (Terziovski 2010)			
0.861	5.20 (1.30)	0.776	Compared with our competitors we have better technologies.
	5.26 (1.56)	0.853	We consider the use of technology as a driver of business growth.
	4.78 (1.59)	0.831	Technological objectives guide the evaluation of new ideas.
	4.51 (1.25)	0.733	Employees search for information and new ideas and technologies.
	4.34 (1.52)	0.816	Employees work toward specific technological goals or objectives.
Organizational culture (Denison 2000)			
0.897	5.63 (1.24)	0.829	There is a clear and consistent set of values that governs the way we do business.
	5.39 (1.41)	0.855	There is an ethical code that guides our behavior and helps us distinguish right from wrong.
	5.87 (1.25)	0.842	There is a strong culture.
	5.22 (1.28)	0.837	There is a clear agreement about the right way and the wrong way to do things.
	4.91 (1.31)	0.751	People from different parts of the organization share a common perspective.
	5.27 (1.39)	0.764	There is a good alignment of goals across levels.

Internal communication (Greenley et al. 2005)			
0.717	5.18 (1.33)	0.883	We frequently discuss market trends across all business functions.
	5.61 (1.21)	0.883	All of our business functions are integrated in serving the needs of our target markets.
Slack (Tan and Peng 2003)			
-	4.40 (1.74)	-	We have a high level of financial flexibility in order to quickly realize interesting projects.
Organizational learning (Kale et al. 2000)			
0.802	5.00 (1.35)	0.834	The organization has acquired and used much new and relevant knowledge that provided competitive advantage over the last three years.
	4.89 (1.40)	0.737	The organization's members have acquired some critical capacities and skills that provided competitive advantage over the last three years.
	4.56 (1.40)	0.737	Organizational improvements have been influenced fundamentally by new knowledge entering the organization over the last three years.
	4.52 (1.61)	0.859	The organization was a learning organization.
Flexibility (Heide and John 1992)			
0.737	4.80 (1.51)	0.760	We can change our work processes without major conflicts, problems and uncooperative behaviors.
	5.34 (1.18)	0.837	We can flexibly respond to necessary adjustments and alignments of the company.
	5.18 (1.44)	0.833	We are capable of quickly adjusting our existing work processes if unexpected events occur.
Long-term orientation (Le Breton-Miller and Miller 2006)			
-	6.05 (1.18)	-	In our firm we focus more on long-term success than on short-term profit.
External communication (adapted from Greenley et al. 2005)			
0.742	4.79 (1.40)	0.850	We establish and cultivate networks in order to gain innovation-relevant stimuli from the environment.
	4.61 (1.74)	0.748	We encourage our stakeholders to participate in the innovation process.
	5.27 (1.50)	0.854	We consciously enter into partnerships and develop them further.
Exploration (He and Wong 2004)			
Objectives for undertaking innovation projects in the last 3 years:			
0.728	5.05 (1.62)	0.815	Extend product range.
	4.71 (1.92)	0.830	Open up new markets.
	4.66 (1.64)	0.773	Enter new technology fields.
Exploitation (He and Wong 2004)			
Objectives for undertaking innovation projects in the last 3 years:			
0.738	5.46 (1.38)	0.789	Improve existing product quality.
	5.24 (1.54)	0.851	Improve production flexibility.
	5.24 (1.53)	0.790	Reduce production cost.
Perceived environmental uncertainty (Moers 2006)			
How do you assess the predictability of changes in:			
0.638	3.73 (1.30)	0.634	Behavior and/ or buying patterns of customers.
	3.32 (1.35)	0.755	Technological developments in your company's primary industry.
	3.76 (1.24)	0.766	Behavior and/ or strategies of competitors.
	3.61 (1.24)	0.610	Behavior and/ or strategies of your suppliers.

References

Adams JS, Taschian A, Shore TH (1996) Ethics in Family and Non-Family Owned Firms: An Exploratory Study. Fam Bus Rev 9(2): 157–170

Aiken M, Hage J (1971) The Organic Organization and Innovation. Sociology 5(1): 63–82

Aldrich HE, Cliff JE (2003) The pervasive effects of family on entrepreneurship: Toward a family embeddedness perspective. J Bus Venturing 18: 573–596

Andersen TJ (2004) Integrating Decentralized Strategy Making and Strategic Planning Processes in Dynamic Environments. J Manag Stud 41(8): 1271–1299

Anderson RC, Reeb DM (2003) Founding-family ownership and firm performance: evidence from the S&P 500. J Financ 58(3): 1301–1327

Armstrong JS, Overton TS (1977) Estimating nonresponse bias in mail surveys. J Marketing Res 14: 396–402

Aronoff CE (1998) Megatrends in family business. Fam Bus Rev 11(3): 181–186

Aronoff CE, Ward JL (1995) Family-Owned Businesses: A Thing of the Past or a Model for the Future? Fam Bus Rev 8(2): 121–130

Arregle JL, Hitt MA, Sirmon DG, Very P (2007) The Development of Organizational Social Capital: Attributes of Family Firms. J Manag Stud 44(1): 73–95

Astrachan J, Jaskiewicz P (2008). Emotional returns and emotional costs in privately-held family businesses: Advancing traditional business valuation. Fam Bus Rev 21(2): 139–150

Astrachan JH, Klein SB, Klein SB, Smyrnios KX (2002) The F-PEC Scale of Family Influence: A Proposal for Solving the Family Business Definition Problem. Fam Bus Rev 15(1): 45–58

Astrachan JH, Kolenko TA (1994) A Neglected Factor Explaining Family Business Success: Human Resource Practices. Fam Bus Rev 7(3): 251–262

Barney J (1991) Firm Resources and Sustained Competitive Advantage. J Manag 17(1): 99–120

Baron RM, Kenny DA (1986) The moderator-mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. J Pers & Soc Psychol 51(6): 1173–1182

Bartholomeusz S, Tanewski GA (2006) The relationship between family firms and corporate governance. J Small Bus Manag 44(2): 245–267

Beckhard R, Dyer WG Jr (1983) SMR Forum: Managing change in the family firm—issues and strategies. Sloan Manag Rev 24: 59–65

Bhattacharya M, Gibson DE, Doty DH (2005) The Effects of Flexibility in Employee Skills, Employee Behaviors, and Human Resource Practices on Firm Performance. J Manag, 31(4): 1–19

Block JH (2009) Long-term orientation of family firms: an investigation of R&D investments, downsizing practices, and executive pay. Wiesbaden: Gabler

Block JH (2012) R&D investments in family and founder firms: An agency perspective. J Bus Venturing 27: 248–265

Bolwijn PT, Kumpe T (1990) Manufacturing in the 1990s – Productivity, flexibility and innovation. Long Range Plann 23(4): 44–57

Bracker J, Keats B, Pearson J (1988) Planning and financial performance among small firms in a growth industry. Strat Manag J 9(6): 591–603

Brown SL, Eisenhardt KM (1995). Product development: past research, present findings, and future directions. Acad Manag Rev 20(2): 343–378

Burns T, Stalker GM (1961) The Management of Innovation. Tavistock, London

Calantone RJ, Cavusgil ST, Zhao Y (2002) Learning orientation, firm innovation capability, and firm performance. Ind Market Manag 31(6): 515–524

Carmines EG, Zeller RA (1979) Reliability and validity assessment. Sage University Paper Series on Quantitative Applications in the Social Sciences, No. 07-017, Sage, Beverly Hills, CA

Carney M (2005) Corporate governance and competitive advantage in family-controlled firms. Entrep Theor Pract 29(3): 249–266

Carney M, Gedajlovic E (2002) The co-evolution of institutional environments and organizational strategies: The rise of family business groups in the ASEAN region. Organ Stud 23: 1–29
Carrasco-Hernandez A, Sanchez-Marin G (2007) The Determinants of Employee Compensation in Family Firms: Empirical Evidence. Fam Bus Rev 20(3): 215–228
Cassia L, De Massis A, Pizzurno E (2012) Strategic innovation and new product development in family firms. Int J Entrepren Behav Res 18 (2): 198–232
Chandler AD (1990) Scale and scope: The dynamics of industrial competition. Cambridge, MA: Harvard University Press
Chang S-J, Van Witteloostuijn A, Eden L (2010) From the Editors: Common method variance in international business research. J Int Bus Stud 41 (2): 178–184
Chen HL, Hsu WT (2009) Family ownership, board independence, and R&D investment. Fam Bus Rev 22(4): 347–362
Chenhall RH (2003) Management control system design within its organizational context: findings from contingency-based research and directions for the future. Account Organ Soc 28: 127–168
Chin CL, Chen YJ, Kleinman G, Lee P (2009) Corporate ownership structure and innovation: Evidence from Taiwan's electronics industry. J Account, Audit & Financ 24(1): 145–175
Chow CW, Shields MD, Wu A (1999) The importance of national culture in the design of and preference for management controls for multi-national operations. Account Organ Soc 24: 44–461.
Chrisman JJ, Chua JH, Kellermanns FW (2009) Priorities, resource stocks, and performance in family and non-family firms. Entrep Theor Pract 33(3): 739–760
Chrisman JJ, Chua JH, Steier LP (2003) An introduction to theories of family business. J Bus Venturing 18(4): 441–448
Chrisman JJ, Chua JH, Steier LP (2005) Sources and Consequences of Distinctive Familiness: An Introduction. Entrep Theor Pract 29(3): 237–247
Chua JH, Chrisman JJ, Sharma P (1999) Defining the Family Business by Behavior. Entrep Theor Pract 23(4): 19–39
Chua JH, Chrisman JJ, Steier LP, Rau SB (2012) Sources of Heterogeneity in Family Firms: An Introduction. Entrep Theor Pract 36(6): 1103–1113
Classen N, Van Gils A, Bammens Y, Carree M (2012) Accessing resources from innovation partners: The search breadth of family SMEs. J Small Bus Manag 50(2): 191–215
Coffman DL (2011) Estimating causal effects in mediation analysis using propensity scores. Structur Equ Model: A Multidiscip J 18(3): 357–369
Cooper RG (2000) Product Innovation and Technology Strategy. Res Technol Manag 43(1): 38
Cooper RG, Kleinschmidt EJ (1987) New products: what separates winners from losers? J Prod Innov Manag 4(3): 169–184
Covin TJ (1994a) Perceptions of Family-Owned Firms: The Impact of Gender and Educational Level. J Small Bus Manag 32
Covin TJ (1994b) Profiling Preference for Employment in Family-Owned Firms. Fam Bus Rev 7(3): 287–296
Craig JBL, Moores K (2006) A 10-Year Longitudinal Investigation of Strategy, Systems, and Environment on Innovation in Family Firms. Fam Bus Rev 19(1): 1–10
Crossan MM, Apaydin M (2010) A Multi-Dimensional Framework of Organizational Innovation: A Systematic Review of the Literature. J Manag Stud 47(6): 1154–1191
Daily CM, Dollinger MJ (1993) Alternative methodologies for identifying family- versus nonfamily-managed businesses. J Small Bus Manag 31(2): 79–90
Daily CM, Dollinger MJ (1992) An Empirical Examination of Ownership Structure in Family and Professionally Managed Firms. Fam Bus Rev 5(2): 117–136
Damanpour F (1991) Organizational Innovation: A meta-analysis of effects of determinants and moderators. Acad Manag J 34(3): 555–590
De Kok JMP, Uhlaner LM, Roy Thurik A (2006): Professional HRM Practices in Family Owned-Managed Enterprises. J Small Bus Manag 44(3): 441–460

De Massis A, Frattini F, Lichtenthaler U (2013) Research on technological innovation in family firms: present debates and future directions. Fam Bus Rev 26(1): 10–31
De Massis A, Frattini F, Pizzurno E, Cassia L (2013) Product innovation in family vs. non-family firms: An exploratory analysis. J Small Bus Manag
Demsetz H, Villalonga B (2001) Ownership structure and corporate performance. J Corp Financ 7(3): 209–233
Denison D (2000) Organizational culture: Can it be a key lever for driving organizational change? In: Cartwright S, Cooper C (eds) The Handbook of Organizational Culture. London: John Wiley & Sons.
Dess GG, Picken JC (2000) Changing roles: Leadership in the 21st century. Organ Dyn 28(3): 18–34
Donckels R, Fröhlich E (1991) Are Family Businesses Really Different? European Experiences from STRATOS. Fam Bus Rev 4(2): 149–160
Donnelley R (1964) The Family Business. Harvard Bus Rev 42(4): 94–105
Dreux DR (1990) Financing family business. Family Bus Rev 3(3): 225–235
Dunn B (1995) Success Themes in Scottish Family Enterprises: Philosophies and Practices Through the Generations. Fam Bus Rev 8(1): 17–28
Dyer WG (1986) Cultural change in family firms: Understanding and managing business and family transitions. San Francisco: Jossey-Bass
Dyer WG (1988) Culture and continuity in family firms. Fam Bus Rev 1(1): 37–50
Dyer WG (1994) Potential Contributions of Organizational Behavior to the Study of Family-Owned Businesses. Fam Bus Rev 7(2): 109–131
Dyer WG (2003) The Family: The Missing Variable in Organizational Research. Entrep Theor Pract 27(4): 401–416
Dyer WG (2006) Examining the "family effect" on firm performance. Fam Bus Rev 19(4): 253–273
Dyer WG, Handler W (1994) Entrepreneurship and family business: exploring the connections. Entrep Theory Pract 3:71–83
Eddleston KA, Kellermanns FW, Sarathy R (2008) Resource configuration in family firms: Linking resources, strategic planning and technological opportunities to performance. J Manag Stud 45(1): 26–50
Ensley MD (2006) Family Businesses Can Out-Compete: As Long as They Are Willing to Question the Chosen Path. Entrep Theor Pract 30(6): 747–754
Ensley MD, Pearson AW (2005) An Exploratory Comparison of the Behavioral Dynamics of Top Management Teams in Family and Nonfamily New Ventures: Cohesion, Conflict, Potency, and Consensus. Entrep Theor Pract 29(3): 267–284
Ernst H (2002) Success factors of new product development: a review of the empirical literature. Int J Manag Rev 4(1): 1–40
Flamholtz EG, Diamond MA, Flamholtz DT (1986) Financial accounting. New York: Macmillan
Freel MS (2005) Perceived Environmental Uncertainty and Innovation in Small Firms. Small Bus Econ 25: 49–64
Garson DG (2008) http://faculty.chass.ncsu.edu/garson/PA765/statnote.htm. Zugegriffen: 28. Okt. 2012
Gedajlovic E, Lubatkin M, Schulze WS (2004) Crossing the threshold from founder management to professional management: A governance perspective. J Manag Stud 41(5): 899–912
Geeraets G (1984) The effect of ownership on the organization structure in small firms. Adm Sci Q, 29: 232–237
Gersick KE, Davis JA, Hampton MM, Lansberg I (1997) Generation to generation: Life cycles of the family business. Cambridge, MA: Harvard Business School Press
Goffee R, Scase R (1985) Proprietorial control in family firms: some functions of 'quasi-organic' management systems. J Manag Stud 22(1): 53–68
Gómez-Mejía LR, Cruz C, Berrone P, De Castro J (2011) The Bind that Ties: Socioemotional Wealth Preservation in Family Firms. Acad Manag Annals 5(1): 653–707

Gómez-Mejía LR, Haynes KT, Núñez-Nickel M, Jacobson KJL, Moyano-Fuentes J (2007) Socioemotional Wealth and Business Risks in Family-Controlled Firms: Evidence from Spanish Olive Oil Mills. Adm Sci Q 52(1): 106–137
Greenley GE, Hooley GJ, Rudd JM (2005) Market orientation in a multiple stakeholder orientation context: implications for marketing capabilities and assets. J Bus Res 58: 1483–1494
Gudmundson D, Tower BC, Hartman EA (2003) Innovation in Small Businesses: Culture and Ownership Structure Do Matter. J Develop Entrepre 8 (1): 1–17
Habbershon TG, Williams ML (1999) A Resource-Based Framework for Assessing the Strategic Advantages of Family Firms. Fam Bus Rev 12(1): 1–25
Habbershon TG, Williams M, MacMillan IC (2003) A unified systems perspective of family firm performance. J Bus Venturing 18(4): 451–465
Hair JF Jr, Black WC, Babin BJ, Anderson RE, Tatham RL (2006) Multivariate data analysis. 6th ed. New Jersey: Prentice Hall
Hall A, Melin L, Nordqvist M (2001) Entrepreneurship as radical change in the family business: Exploring the role of cultural patterns. Fam Bus Rev 14: 193–208
Hall A, Nordqvist M (2008) Professional Management in Family Businesses: Toward an Extended Understanding. Fam Bus Rev 21(1): 51–69
Hambrick DC, Mason PA (1984) Upper Echelons: The Organization as a Reflection of Its Top Managers. Acad Manag Rev 9(2): 193–206
Handler WC (1989) Methodological Issues and Considerations in Studying Family Businesses. Fam Bus Rev 2(3): 257–276
Harris D, Martinez JI, Ward JL (1994) Is strategy different for the family-owned business?, in: Fam Bus Rev 7(2): 159–174
Harris RID, Reid RS, McAdam R (2004) Employee involvement in family and non-family-owned businesses in Great Britain. Int J Entrepren Behav Res 10(1/2): 49–58
Harzing AW, Sorge A (2003) The relative impact of country of origin and universal contingencies on internationalization strategies and corporate control in multinational enterprises: worldwide and European perspectives. Organ Stud 24(2): 187–214
Hayton JC, Kelley DJ (2006) A competency-based framework for promoting corporate entrepreneurship. Human Res Manag 45(3): 407–427
He Z-L, Wong P-K (2004) Exploration vs. exploitation: An empirical test of the ambidexterity hypothesis. Organ Sci, 15(4): 481–494
Heck RKZ (2004) A Commentary on "Entrepreneurship in Family vs. Non-Family Firms: A Resource-Based Analysis of the Effect of Organizational Culture". Entrep Theor Pract 28(4): 383–389
Heide JB, John G (1992): Do Norms Matter in Marketing Relationships? J Marketing, 56(4): 32–44
Hobday M (2005) Firm-level innovation models: perspectives on research in developed and developing countries. Technol Anal & Strat Manag 17(2): 121–146
Höppe F, Moers F (2011) The choice of different types of subjectivity in CEO annual bonus contracts. Account Rev, 86(6): 2023–2046
Horton TP (1986) Managing in a family way. Manag Rev 75(2): 3
Hsu LC, Chang HC (2011) The role of behavioral strategic controls in family firm innovation. Ind & Innov 18(7): 709–727
Hülsbeck M, Lehmann EE, Weiß D, Wirsching K. (2012) Innovationsverhalten in Familienunternehmen. Z Betriebswirtsch 82: 71–91
Huybrechts J, Voordeckers W, Lybaert N, Vandemaele S, (2011) The distinctiveness of family-firm intangibles: A review and suggestions for future research. J Manag & Organ 17(2): 268–287
James HS (1999) Owners as manager, extended horizons and the family firm. Int J Econ Bus, 6(1): 41–55
James LR, Brett JM (1984) Mediators, moderators, and tests for mediation. J Appl Psychol 69(2): 307–321

Jaskiewicz P, González VM, Menéndez S, Schiereck D (2005) Long-Run IPO Performance Analysis of German and Spanish Family-Owned Businesses. Fam Bus Rev 18(3): 179–202
Jorissen A, Laveren E, Martens R, Reheul A-M (2005) Real Versus Sample-Based Differences in Comparative Family Business Research. Fam Bus Rev 18(3): 229–246
Kale P, Singh H, Perlmutter H (2000) Learning and protection of proprietary assets in strategic alliances: building relational capital. Strat Manag J 21(3): 217–237
Kanter RM (1997) Rosabeth Moss Kanter on the frontiers of management. Harvard Business Press
Kao JJ (1997) The art & discipline of business creativity. Strat & Leadersh 25(4): 6–11
Kellermanns FW, Eddleston KA (2006) Corporate Entrepreneurship in Family Firms: A Family Perspective. Entrep Theor Pract 30(6): 809–830
Kellermanns FW, Eddleston KA, Barnett T, Pearson A (2008) An exploratory study of family member characteristics and involvement: Effects on entrepreneurial behavior in the family firm. Fam Bus Rev 21(1): 1–14
Kellermanns FW, Eddleston KA, Sarathy R, Murphy F (2012) Innovativeness in family firms: a family influence perspective. Small Bus Econ 38(1): 85–101
Kepner E (1991) The family and the firm: A coevolutionary perspective. Fam Bus Rev 4(4): 445–461
Kets de Vries MFR (1993) The dynamics of family controlled firms: The good and the bad news. Organ Dyn 21(3): 59–71
Kirzner IM (1979) Perception, Opportunity, and Profit. Chicago: University of Chicago Press
Klomp L, Van Leeuwen G (2001) Linking Innovation and Firm Performance: A New Approach. International J Econ Bus 8(3): 343–364
Koc T (2007) Orgnaizational determinants of innovation capacity in software companies. Computers & industrial engineering 53: 373–385
Koc T, Ceylan C (2007) Factors impacting the innovative capacity in large-scale companies. Technovation 27(3): 105–114
Kotey B (2005) Are performance differences between family and non-family SMEs uniform across all firm sizes? Inter J Entrepren Behav Res 11(6): 394–421
Kotey B, Folker C (2007) Employee Training in SMEs: Effect of Size and Firm Type – Family and Nonfamily. J Small Bus Manag 45(2): 214–238
Landes D (1949) French entrepreneurship and industrial growth in the nineteenth century. J Econ Hist, 9: 45–61
Le Breton-Miller I, Miller D (2006) Why Do Some Family Businesses Out-Compete? Governance, Long-Term Orientations, and Sustainable Capability. Entrep Theor Pract 30(6): 731–746
Le Breton-Miller I, Miller D, Lester RH (2011) Social Embeddedness Reconciliation of Conduct and Performance. Organ Sci 22(3): 704–721
Levinson RE (1987) Problems in managing a family-owned business. In CE Aronoff & JL Ward (Eds.), Family business sourcebook: 169-174. Detroit: Omnigrahpics, Inc.
Li T, Calantone RJ (1998) The Impact of Market Knowledge Competence on New Product Advantage: Conceptualization and Empirical Examination. J Marketing 62(4): 13–29
Lichtenthaler U (2009) Absorptive Capacity, Environmental Turbulence, and the Complementarity of Organizational Learning Processes. Acad Manag J 52(4): 822–846
Lichtenthaler U, Muethel M (2012) The impact of family involvement on dynamic innovation capabilities: Evidence from German manufacturing firms. Entrep Theor Pract 36(6): 1235–1253
Litz RA, Kleysen RF (2001) Your old men shall dream dreams, your young men shall see visions: Toward a theory of family firm innovation with help from the Brubeck family. Fam Bus Rev 14(4): 335–352
Lumpkin GT, Dess GG (1996) Clarifying the Entrepreneurial Orientation Construct and Linking It to Performance. Acad Manag Rev 21(1): 135–172
Lyman AR (1991) Customer service: does family ownership make a difference?. Fam Bus Rev 4(3): 303–324
Mackie R (2001) Family ownership and business survival: Kirkcaldy, 1870–1970. Bus Hist, 43: 1–32

McEachern WA (1978) Corporate Control and Growth: An Alternative Approach. J Ind Econ 26(3): 257–266
Miller D, Le Breton-Miller I (2005) Managing for the long run: Lessons in competitive advantage from great family businesses. Boston: Harvard Business School Press
Miller D, Le Breton-Miller I (2006) Family governance and firm performance: Agency, stewardship, and capabilities. Fam Bus Rev 19(1): 73–87
Miller D, Le Breton-Miller I, Scholnick B (2008) Stewardship vs. Stagnation: An Empirical Comparision of Small Family and Non-Family Businesses. J Manag Stud 45(1): 51–78
Minichilli A, Corbetta G, MacMillan IC (2010) Top Management Teams in Family-Controlled Companies: 'Familiness', 'Faultlines', and Their Impact on Financial Performance. J Manag Stud 47(2): 205–222
Mishra CS, McConaughy DL (1999) Founding Family Control and Capital Structure: The Risk of Loss of Control and the Aversion to Debt. Entrep Theor Pract 23(4): 53–64
Moers F (2006) Performance Measure Properties and Delegation. Account Rev 8(4): 897–924
Mone MA, McKinley W, Barker III VL (1998) Organizational decline and innovation: A contingency framework. Acad Manag Rev 23(1): 115–132
Moores K (2009) Paradigms and Theory Building in the Domain of Business Families. Fam Bus Rev 22(2): 167–180
Morck R, Stangeland DA, Yeung B. (2000) Inherited wealth, corporate control, and economic growth: The Canadian disease. In: Morck R (eds), Concentrated corporate ownership, 319–369. Chicago: University of Chicago Press
Morris MH (1998) Entrepreneurial intensity. Westport, CT: Quorum Books
Munari F, Oriani R, Sobrero M (2010) The effects of owner identity and external governance systems on R&D investments: A study of Western European firms. Res Policy 39(8): 1093–1104
Naldi L, Nordqvist M, Sjöberg K, Wiklund J (2007) Entrepreneurial Orientation, Risk Taking, and Performance in Family Firms. Fam Bus Rev 20(1): 33–47
Neubauer F, Lank AG (1998) The Family Business: Its Governance for Sustainability. Macmillan Press, London
Nunnally JC (1978) Psychometric Theory. New York, NY: Mcgraw Hill
Pearson AW, Carr JC, Shaw JC (2008) Toward a theory of familiness: A social capital perspective. Entrep Theor Pract 32(6): 949–969
Pinto JK, Prescott JE (1988) Variations in critical success factors over the stages in the project life cycle. J Manag 14: 5–18
Podsakoff PM, Organ DW (1986) Self-reports in organizational research: problems and prospects. J Manag 12(4): 531–544
Podsakoff PM, MacKenzie SB, Lee J-Y, Podsakoff N (2003) Common Method Biases in Behavioral Research: A Critical Review of the Literature and Recommended Remedies. J Appl Psychol 88 (5): 879–903
Posch A, Speckbacher G (2012) Führung in Familienunternehmen: Besonderheiten der Entscheidungsfindung und Verhaltenssteuerung und deren Auswirkung auf den Unternehmenserfolg. Z Betriebswirtsch 82: 5–23
Poza EJ, Alfred T, Maheshwari A (1997) Stakeholder Perceptions of Culture and Management Practices in Family and Family Firms – A Preliminary Report. Fam Bus Rev 10(2): 135–155
Quinn JF (1988) Inside information and the small close corporation. Proceedings of the 1988 Annual meeting. International Council for Small Business (pp. 229–235). Marietta , GA: School of Business, Kennesaw College
Reid RS, Adams JS (2001) Human resource management - a survey of practices within family and non-family firms. J Europ Ind Training 25(6): 310–320
Rogers EM (1983) Diffusion of Innovation. New York: Free Press
Rogoff EG, Heck RKZ (2003) Evolving research in entrepreneurship and family business: recognizing family as the oxygen that feeds the fire of entrepreneurship, J Bus Venturing, 18(5): 559–566

Rosenbaum P, Rubin D (1983) The Central Role of the Propensity Score in Observational Studies for Causal Effects. Biometrika 70(1): 41–55
Salvato C (2004) Predictors of entrepreneurship in family firms. J Priv Equity 7(3): 68–76
Schulze WS, Lubatkin MH, Dino RN (2002) Altruism, agency and the competitiveness of family firms. Manag Decis Econ 23: 247–259
Schulze WS, Lubatkin MH, Dino RN (2003) Toward a theory of agency and altruism in family firms. J Bus Venturing, 18: 473–490
Schulze WS, Lubatkin MH, Dino RN, Buchholtz AK (2001) Agency Relationships in Family Firms: Theory and Evidence. Organ Sci 12(2): 99–116
Sciascia S, Mazzola P (2008) Family involvement in ownership and management: Exploring non-linear effects on performance. Fam Bus Rev 21(4): 331–345
Shane S, Venkataraman S (2001) Entrepreneurship As a Field of Research: A Response to Zahra and Dess, Singh, and Erikson. Acad Manag Rev 26(1): 13–16
Sharma P (2004) An Overview of the Field of Family Business Studies: Current Status and Directions for the Future. Fam Bus Rev 17(1): 1–36
Sharma P, Chrisman JJ, Chua JH (1997) Strategic management of the family business: Past research and future challenges. Fam Bus Rev 10(1): 1–36
Short JC, Payne GT, Brigham KH, Lumpkin GT, Broberg JC (2009) Family firms and entrepreneurial orientation in publicly traded firms. Fam Bus Rev 22: 9–24
Sirmon DG, Hitt MA (2003) Managing Resources: Linking Unique Resources, Management, and Wealth Creation in Family Firms. Entrep Theor Pract 27(4): 339–358
Smith M, Busi M, Ball P, Van Der Meer R (2008) Factors influencing an organisation's ability to manage innovation: A structured literature review and conceptual model. Int J Innovat Manag 12(4): 655–676
Sobel ME (1982) Asymptotic confidence intervals for indirect effects in structural equation models. Soc Methodol 13(1982): 290–312
Sorenson RL, Goodpaster KE, Hedberg PR, Yu A (2009) The Family Point of View, Family Social Capital, and Firm Performance An Exploratory Test. Fam Bus Rev 22(3): 239–253
Speckbacher G, Wentges P (2012) The impact of family control on the use of performance measures in strategic target setting and incentive compensation: A research note. Manag Account Res 23(1): 34–46
Tagiuri R, Davis J (1996) Bivalent Attributes of the Family Firm. Fam Bus Rev 9(2): 199–208
Tan J, Peng MW (2003) Organizational slack and firm performance during economic transitions: two studies from an emerging economy. Strat Manag J 24(13):1249–1263
Terziovski M (2010) Innovation practice and its performance implications in small and medium enterprises (SMEs) in the manufacturing sector: A resource-based view. Strat Manag J, 31: 892–902
Thompson VA (1965) Bureaucracy and Innovation. Adm Sci Q 10(1): 1–20
Tidd J (2001) Innovation management in context: environment, organization and performance. Int J Manag Rev, 3: 169–83
Tushman ML (1977) Special boundary roles in the innovation process. Adm Sci Q 22(4): 587–605
Tushman ML, O'Reilly CA (1997) Winning Through Innovation: A Practical Guide to Leading Organizational Change and Renewal. Boston, MA: Harvard Business School Press
Upton N, Teal EJ, Felan JT (2001). Strategic and business planning practices of fast growth family firms. J Small Bus Manag 39(1): 60–72
Vago M (2004) Integrating change management: Challenges for family business clients and consultants. Fam Bus Rev 17(1): 71–80
Vallejo M (2008) Is the Culture of Family Firms Really Different? A Value-based Model for Its Survival through Generations. J Bus Ethics 81(2): 261–279
Van der Stede WA, Young SM, Chen CX (2005) Assessing the quality of evidence in empirical management accounting research: The case of survey studies. Account Organ Soc 30(7-8): 655–684

Ward JL (1997) Growing the Family Business: Special Challenges and Best Practices. Fam Bus Rev 10(4): 323–337
Ward JL (1988) The Special Role of Strategic Planning for Family Businesses. Fam Bus Rev 1(2): 105–117
Westhead P, Cowling M (1998) Family Firm Research: The Need for a Methodological Rethink. Entrep Theor Pract 23(1): 31–56
Whisler TL (1988) The Role of the Board in the Threshold Firm. Fam Bus Rev 1(3): 309–321
Williams LJ, Hazer JT (1986) Antecedents and Consequences of Satisfaction and Commitment in Turnover Models-A Reanalysis Using Latent Variable Structural Equation Methods. J Appl Psychol 71(2): 219–231
Wortman MS (1994) Theoretical Foundations for Family-Owned Business: A Conceptual and Research-Based Paradigm. Fam Bus Rev 7(1): 3–27
Young SM (1996) Survey research in management accounting: a critical assessment. In: Richardson AJ (eds) Research Methods in Accounting: Issues and Debates, CGA Canada: Research Foundation
Zahra SA (2005) Entrepreneurial risk taking in family firms. Fam Bus Rev 18(1): 23–40
Zahra SA (2010) Harvesting family firms' organizational social capital: A relational perspective. J Manag Stud 47(2): 345–366
Zahra SA, Hayton JC, Salvato C (2004) Entrepreneurship in Family vs. Non-Family Firms: A Resource-Based Analysis of the Effect of Organizational Culture. Entrep Theor Pract 28(4): 363–381
Zahra SA, Neubaum DO, Larrañeta B (2007) Knowledge sharing and technological capabilities: The moderating role of family involvement. J Bus Res 60(10): 1070–1079